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Predictors of Career and College Persistence among Baltimore City Schools Graduates: Implications for Differences between Career and College Destinations

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Executive Summary

Recently, policies supporting readiness for college have shifted to Career and College Readiness. However, whether readiness for 'career' and 'college' is a singular construct is a hypothesis requiring empirical research. I address this gap, investigating whether the same high school factors (e.g., grades, assessments, CTE) predict college persistence and workforce persistence in over the first four years after graduation. I use MLDS data featuring three consecutive cohorts of graduates from Baltimore City Public Schools progressing to both college and the workforce, as well as their academic and non-cognitive characteristics from high school. Results suggest differences between factors that predict college persistence relative to workforce persistence. In particular, academic proficiency, advanced course-taking, and final GPA were associated with college persistence, but not consistent workforce participation. Stable employment was predicted by graduates' high school attendance rate, CTE pathway completion, and working during 12th grade. I discuss the relative importance of different factors for each pathway and these findings' implications for policy.

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Introduction

National and state-level college and career readiness (CCR) aims have a pronounced focus on academic readiness for college (Asch, 2010; Barnes, & Slate, 2013; Symonds, Schwartz, & Ferguson, 2011), and similarly, research on postsecondary success tends to focus on access and persistence in college (Conley, 2007; Roderick, Nagaoka, & Coca, 2009). This emphasis is sensible, reflecting recent shifts in the labor market that have made postsecondary education necessary for long-term job stability and gainful earnings (Carnevale, Strohl, & Smith, 2009; Carnevale, Rose, & Cheah, 2011). Recent state guidelines under the *Every Student Succeeds Act* (ESSA) also tend to emphasize experiences favoring college preparedness, such as dual enrollment and early college opportunities, advanced coursework (e.g., Advanced Placement, four years of math or lab science), and reducing students' needs for developmental courses upon entry to college (Malin, Bragg, & Hackmann, 2017).

However, sizeable shares of high school graduates report intentions of working fulltime right away without enrolling in college (Ingels & Dalton, 2013; Radford, Fritch, Leu & Duprey, 2018), and research from individual districts nationally suggests that many students forgo college after high school, at least for some period of time (Durham, Ruiz, & Connolly, 2017; Durham & Connolly, 2018; Settersten, Furstenberg, & Rumbaut, 2008). Further, even students enrolled in college co-identify as both student and worker (Perna, 2010; Staff & Mortimer, 2008), as financial challenges compel students to work while enrolled (Ehrenberg & Sherman, 1987; Gleason, 1993). Relevant also are the disparities in postsecondary opportunity between low-income and wealthier students, where economically disadvantaged populations likely face an immediate income opportunity cost from college attendance (Dynarski, 2008) and a number of barriers to further education (Eccles, Arberton, Buchanan, Janis, Flanagan, et al., 1993).

From a pragmatic perspective, these realities suggest that engagement in meaningful activity after high school should be more broadly construed than college enrollment (Barnes & Slate, 2013; Gray & Herr, 2006; Symonds et al., 2011). However, the literature is surprisingly sparse with respect to workforce pathways of high school graduates or mixed (i.e., college and work) pathways, as well as regarding what best prepares those who wish to enter the workforce directly. This study addresses this gap by examining transitions into college and/or the workforce among a predominantly low-income population of high school graduates, and identifying the relationship between the activities to which graduates first transition and their activity over the following four years. In doing so, this research is agnostic about what activity after high school graduates hypothetically should undertake to be most successful later on, and instead presents the patterns of this population as they are. This information may be useful for policymakers and school leaders tasked with taking comprehensive steps to support students' actual choices and pathways after high school.

Background

Transition to Adulthood

The markers and correlates of a successful transition to adulthood have been researched by scholars in the fields of psychology (Arnett 2001; 2003; Schulenberg, Bryant, & O'Malley, 2004), education (Brock, 2010), sociology (Kerckhoff, 2001; Mortimer, Zimmer-Gembeck, Holmes, & Shanahan, 2002), public health (Fuligni & Hardway, 2004;) and economics (Danziger & Ratner, 2010; Hamilton, 2010). Particularly in Western cultures, the transition to adulthood is a process rather than an event. A body of work by Arnett (1998; 2001) suggests that capabilities mark a successful transition, including making decisions independently, having financial independence, and taking responsibility for one's own actions (Arnett, 1998). More tangibly, life course milestones also signify the transition, such as moving out of the family home, marriage, childbearing, buying a house, graduating from college, and working full time (Arnett, 2001; Hogan & Astone, 1986, Leventhal, Graber, & Brooks-Gunn, 2001). Yet, given that transitioning takes time, each milestone contributes to, rather than affirms the transition. Moreover, determining whether transitions are successful are generally only known after the fact. For instance, enrolling in college certainly indicates positive momentum towards gainful adulthood, but success may entail persisting in college or ultimately earning a degree. Later still, completing a degree may not signify success without a lucrative job opportunity.

In the education sector, transitioning to adulthood is made more clear-cut through ceremonial rituals such as graduation from high school or from college. Yet a distinct onset of adulthood is still elusive and depends upon an individual's long term goals and resources. For a 21st century high school practitioner, preparing students for the next stage of the life course has resoundingly come to mean readiness for college.

Research on College and Career Readiness

Research on college readiness suggests that students should have academic subject proficiency (Barnes, 2010; Conley, 2007; 2008; Porter & Polikoff, 2012) and certain non-academic dispositions (Conley, 2007; Roderick et al., 2009). Accordingly, states and districts have adopted College and Career Readiness aims (e.g., Common Core State Standards, Next-Generation Science Standards) and assessments to better prepare students for postsecondary educational opportunities. Several other domains of readiness have been proposed, including cognitive strategies (e.g., problem-solving, analyzing and evaluating conflicting information), and contextually relevant knowledge, i.e., "college knowledge."

In recent years, stakeholders in the educational policy arena began offering guidance to secondary and postsecondary agencies around college readiness with the simultaneous goal of informing career readiness (c.f., Educational Policy Improvement Center, National Assessment Governing Board, and various state Boards of Education, as cited in Conley, 2012). At the same time, differentiation between the 'college' and 'career' elements of 'college and career readiness' appears to be rare. Recognizing the increasing importance of postsecondary

credentials for gainful employment, the majority of literature on the transition from high school neglects workforce-bound graduates and focuses primarily on high-school-to-college transitions (Blustein, Juntunen & Worthington, 2000; Gray & Herr, 2006; Worthington & Juntunen, 1997). Further, 33 out of 37 states with Career and College Readiness policies use a single definition that does not differentiate between college and career (Mishkind, 2014).

However, among a nationally-representative ninth grade cohort, the High School Longitudinal Study of 2009, 28% of graduates did not enroll in college during the first three years after high school, and one-third of these non-enrollees reported that earning an income took precedence over further education (Radford et al., 2018). Little evidence exists about the stability of workforce-bound students' employment, though related research suggests young adults who 'meander' (Arnett, 2004) or 'flounder' via inconsistent participation in the labor force are at risk for lower lifetime earnings (Krahn, Howard & Galambos, 2012). The U.S. also lacks clear articulation systems between education and work (Kerckhoff, 2001; 2003; Rosenbaum, Kariya, Settersten & Maier, 1990), and as a result, schools have few metrics to inform students about their readiness for work in the same way that students are deemed ready for college (Casner-Lotto & Barrington, 2006; Conley, 2010).

As Achieve (2016) and others emphasize, there is clearly some degree of overlap between career and college readiness markers. According to the Association of Career and Technical Education (ACTE), career readiness includes proficiency in core academic subjects, technical skills for particular industries, and traits like dependability and critical thinking (ACTE, 2010). The WorkKeys readiness assessment developed by ACT, Inc. (2011) also emphasizes hard skills, especially reading and math proficiency, and soft skills such as effective communication, and collaboration.

Since the primary traditional role of secondary schools is to prepare students for tertiary education, there is "too little recognition of the role of the school in preparing students for citizenship and *employment*" [emphasis added] (Evans, 1968, p. 189, in Schultz and Stern, 2013). This is regrettable, given the shares of graduates who do not access college (Green & Forster, 2003; Page & Scott-Clayton, 2016), and the high numbers of college students who leave college without completing to enter the workforce (Bound et al., 2010; Goldrick-Rab, 2009).

This study provides an opportunity to examine indicators of readiness for postsecondary success for both destinations among a population of low-income high school graduates, who historically move directly into work at higher rates than higher-income peers. Although the term "readiness" in postsecondary contexts is ambiguous, in the current study, postsecondary success is operationalized as consistent engagement in productive activity for four years post-high school. Persistence in college or work is but one possible definition of success; however, it is preferable to others (e.g., earning a living wage or completing college courses) because of its parsimony. Consistent engagement in formal activities is an essential ingredient of success in early adulthood. Moreover, persistence can be determined regardless of postsecondary destination, its meaning generalizes to other geographic locations in a way that wages do not, and it accounts for delayed enrollment in college. The study is an essential first step toward later studies to examine relationships between high school experiences and gainful wages or college-specific outcomes. The results will provide more clarity about the extent of overlap

between college and work readiness and identify whether there are distinct metrics of workforce readiness that high school practitioners should emphasize for students with different post-graduation goals.

Research Questions

This report responds to the Maryland Longitudinal Data System Center (MLDS) Center Research Agenda questions: (1) *Are Maryland students academically prepared to enter postsecondary institutions and complete their programs in a timely manner? And (2) What are the workforce outcomes for Maryland high school students who complete Career Technical Education coursework, who either enter the workforce directly?*

Specific research questions to be addressed by the analyses include:

RQ1. What postsecondary pathways did graduates take, and what share were consistently engaged in college and/or the workforce?
RQ2. Are student-level predictors of college persistence the same as for workforce persistence?

Method

The data used for this report are from the Maryland Longitudinal Data System (MLDS), which contains linked longitudinal data from three State agencies. Data used in the analysis were prepared in September 2018. The Maryland State Department of Education (MSDE) provides data for public PreK-12 students and schools. The Maryland Higher Education Commission (MHEC) provides data for Maryland public and private college students and colleges. The Department of Labor (DoL) provides data for Maryland employees who work for employers who are subject to Maryland's Unemployment Tax law. The workforce data do not include information for out-of-state workers, federal employees, military employees, individuals who are self-employed, or private contractors. Out-of-state college enrollments and degrees are obtained through the National Student Clearinghouse (NSC).

Sample Selection

The population used in the current study includes students who received a diploma from Baltimore City Public Schools between July 1, 2010 and June 30, 2013, i.e., the graduating classes of 2011 through 2013. This population was identified using two criteria. First, included students had a 'C60' or 'C70' exit code (referring to diploma completion or early college enrollment, respectively) and second, included students' graduation year was evident via an associated exit date or the school year of their terminal record and relevant exit code. Students

with a different or no exit code, and those with a 'C62' exit code (indicating a certificate of completion), were excluded from the analytic population. These criteria resulted in an analytic population of approximately 13,500 (rounded to the nearest 100).

Measures

The primary outcome, postsecondary persistence, was conceptualized as four mutually exclusive categories representing activity in which graduates could be observed over 16 consecutive fiscal quarters, beginning July 1 following the high school graduation event and ending June 30 four years later. Preliminary analysis found that just 36% of graduates were consistently engaged in either college or work activity for 16 quarters, which suggested that a less stringent threshold was necessary to capture meaningful variation across outcomes. After further descriptive analysis, the threshold was reduced from 16 to 14 consecutive quarters of formal activity. As a result, 'persistence' is operationalized as formal activity for four years, allowing for two (consecutive or non-consecutive) months of absence from both college and the workforce.

The final categories, and responding to the first research question -- the share of graduates in each pathway were:

1. Postsecondary enrollment for 14 fiscal quarters (14%);
2. Maryland workforce participation for 14 fiscal quarters (20%);
3. Postsecondary enrollment and/or Maryland workforce participation for 14 quarters (15%);
4. Inconsistent enrollment or workforce participation over 14 quarters, i.e., graduate was absent from postsecondary enrollment or Maryland workforce participation records for at least 3 quarters, or 9 months (51%).

The primary independent student-level variables were generated in three categories: (i) demographic and education services; (ii) academic proficiency; and (iii) non-cognitive characteristics.

(i) Demographic characteristics reflected students' status in 12th grade. These included dichotomous indicators of male gender, African-American (relative to white or Asian), and Hispanic ethnicity. Service characteristics reflected a student's status at *any* time between 9th and 12th grade. Dichotomous indicators were created for having received free/reduced-price meals (FARMS), English language learner (ELL), special education, and homeless services.

(ii) Academic characteristics were represented by seven variables. First, scales of graduates' highest High School Assessment (HSA) scores in the four subjects Maryland tests were created. Because of potential multicollinearity, two scales were generated, with one the

average of graduates' highest biology and algebra HSA score, and the second an average of graduates' highest English and government HSA score. Second, a dichotomous variable was created to capture whether students graduated having completed any CTE pathway. A dummy indicator was also created indicating whether graduates took an Advanced Placement course, as well as separate dummy indicators of whether they met the University System of Maryland requirements in math, science, and foreign language.

(iii) Non-cognitive characteristics included: a dichotomous indicator of graduating with a GPA of 3.0 or higher, intended to proxy student effort throughout high school; students' daily attendance rate as a weighted average of the ratio of their 9th through 12th grade days present to total days absent and present; the number of times a student changed schools between 9th and 12th grade; and the number of quarters during 12th grade that students had a record of employment in Maryland.

Additional control variables were also included in the analysis. These included age in months at high school graduation; dichotomous variables for each graduating year to account for heterogeneity across cohorts; and dichotomous variables for City Schools' five primary high school types: 1) College prep-oriented high schools with the highest entrance criteria; 2) career-technology education (CTE) centers with (somewhat lower) entrance criteria; 3) traditional high schools with no entrance criteria; 4) charter/contract and transformation schools, each with an external operator, varying admission requirements, and various college or career foci; and 5) special placement schools, into which over-aged and under-credited students are assigned placement. Accounting for variation by high school type is critical, given that City Schools has a city-wide high school choice policy that sorts and stratifies students according to their demographic and academic characteristics.

Analyses

To measure the student-level relationships between high school factors and postsecondary persistence in the four potential pathways, multinomial logistic and logistic regressions were estimated. Post-estimation of multinomial logistic regressions confirmed the independence of estimates across outcome categories (i.e., outcome categories should not be collapsed). Robust standard errors were estimated to account for student nesting within schools, with student's graduating high school used as the nesting variable. In addition, all non-dichotomous variables were included in models as z-scores.

Findings

Means and standard deviations for all primary independent variables by outcome category are shown in Table 1.[1] Preliminary differences in academic, non-cognitive and demographic

[1] See Appendix A for descriptive statistics for the total analytical population.

characteristics between graduates found in the four pathway groups are immediately evident: Graduates who were consistently enrolled in college were, on average, more likely to be white/Asian and female and were less likely to qualify for FARMS or receive special education services. Regarding academic characteristics, the persistence-in-college-only graduates had higher HSA scores, were much more likely to have taken AP classes, and to have met USM requirements in math, science, and foreign language.

Table 1. Means (Standard Deviations) for Independent Variables, by Outcome Category

	College Enrollment, 14Qs	Maryland Workforce, 14 Qs	Enrollment and/or Workforce, 14Qs	More than 2 Qs with No Activity
Demographic/Service characteristics				
Male	.38 (.49)	.45 (.50)	.36 (.48)	.48 (.50)
Black	.83 (.38)	.93 (.25)	.93 (.25)	.92 (.27)
White or Asian	.14 (.32)	.06 (.24)	.05 (.22)	.07 (.25)
Latinx	.02 (.13)	.02 (.13)	.01 (.10)	.02 (.15)
Free/reduced-price meal eligible	.72 (.45)	.93 (.26)	.87 (.34)	.92 (.27)
Special education	.03 (.17)	.10 (.30)	.05 (.22)	.17 (.37)
English language learner	.02 (.15)	.01 (.11)	.02 (.12)	.03 (.16)
Homeless services	.02 (.13)	.03 (.17)	.03 (.16)	.05 (.21)
Academic proficiency				
HSA score, Algebra and Biology	432.45 (23.91)	408.53 (20.25)	418.33 (21.20)	404.34 (23.74)
HSA score, English and Gov't	425.11 (23.53)	400.19 (20.74)	409.81 (21.71)	395.90 (24.62)
Took $\geq$1 AP course	.54 (.50)	.17 (.38)	.32 (.47)	.12 (.33)
Met USM req's in math	.48 (.50)	.14 (.35)	.29 (.45)	.13 (.33)
Met USM req's in science	.26 (.44)	.03 (.18)	.09 (.29)	.02 (.16)
Met USM req's in foreign language	.52 (.50)	.20 (.40)	.34 (.47)	.18 (.38)
CTE pathway completed	.17 (.37)	.32 (.47)	.25 (.43)	.21 (.41)
Non-cognitive characteristics				
Final GPA of $\geq$ 3.0	.53 (.50)	.11 (.31)	.27 (.44)	.09 (.29)
Average daily attendance rate	95.81 (4.50)	89.41 (9.10)	92.93 (6.98)	86.53 (10.47)
Numb. school changes	.10 (.46)	.45 (.86)	.25 (.65)	.72 (1.13)
Numb. Qs worked in 12th grade	.78 (1.29)	1.74 (1.64)	1.16 (1.50)	.62 (1.15)

Among the non-cognitive indicators, this group also had the highest likelihood of finishing high school with at least a 3.0 GPA, the highest attendance rates, and the lowest level of school mobility. While those who were persistently enrolled in college had higher levels on these indicators than those who were consistently either working and/or enrolled, both groups were similar across these characteristics, and had more positive levels on all indicators relative to the graduates who were consistently in the workforce, and those with three or more quarters of no record of activity.

Relative to students who were consistently in the Maryland workforce only, graduates who spent three or more quarters with no recorded activity (hereafter referred to as 'inconsistent') were more likely to have received special education services and homeless services in high school. Their academic characteristics show lower HSA scores, on average, and lower levels of AP course taking and meeting USM admission requirements. Furthermore, graduates with inconsistent activity after high school had an average daily attendance rate that was the lowest of all four groups, along with the lowest GPAs and highest levels of school mobility.

Predicting Consistent Activity after High School

Next, the relationship between all indicators and graduates' four-year pathway outcomes are examined in a comparative analytical framework using multinomial logistic regression. These results are shown in Table 2.

Comparing predictors of enrollment-only persistence and enrollment and/or workforce persistence, statistical significance is largely similar, with three exceptions: meeting USM science requirements, FARMS eligibility, and Latinx status. Meeting the USM science requirements increased the risk of the college-only pathway but not the combination pathway, relative to the inconsistent activity pathway. Both FARMS and Latinx status were associated with lower relative risk of the college-only path, but were not associated with the combination pathway.

Estimates for predictors of the enrollment-only pathway confirm the importance of academic proficiency and non-cognitive traits for college persistence: higher HSA scores in English and government, as well as meeting USM requirements in math, science, and foreign language each increased the relative risk of college persistence. Completing a CTE pathway also increased the likelihood of persistent enrollment. Concerning non-cognitive variables, a B-average final high school GPA more than doubled the relative risk of college persistence, and graduates' average daily attendance rate in high school more than tripled the risk of staying enrolled.

The estimates for workforce persistence over 14 quarters are notably different from those of the other pathways. While CTE pathway completion and average daily attendance rate increased the risk of workforce persistence relative to the inconsistent activity pathway, these two variables were somewhat less predictive of consistently working than being consistently enrolled (or enrolled and/or working). Furthermore, each additional quarter graduates worked during their senior year more than doubled the relative risk of workforce persistence, while for the college persistence pathway, this variable was a weaker predictor. Most notably, none of the subject area proficiency or coursework variables were related to consistent workforce-only participation. The sole exception was completing a CTE pathway. Interestingly, too, school mobility in high school decreased the risk of workforce persistence but was unrelated to college persistence.

Table 2. Multinomial Logistic Regression of Four-Year Postsecondary Pathway Categories on Demographic, Academic, and Non-Cognitive Readiness Indicators, Baltimore City Public Schools Graduating Classes of 2011-2013

	College enrollment only, 14Qs		Maryland workforce only, 14 Qs		Enrollment and/or Workforce, 14Qs	
	RRR	[95% CI]	RRR	[95% CI]	RRR	[95% CI]
Academic characteristics						
HSA score, Algebra and Biology	1.04	[0.89, 1.21]	0.96	[0.88, 1.05]	1.11	[1.00, 1.23]
HSA score, English and Gov't	1.60***	[1.39, 1.83]	1.04	[0.95, 1.14]	1.13*	[1.01, 1.27]
Took ≥1 AP course	1.79***	[1.49, 2.15]	1.12	[0.93, 1.34]	1.32**	[1.10, 1.58]
Met USM req's in math	1.41***	[1.21, 1.63]	1.09	[0.93, 1.28]	1.32***	[1.14, 1.53]
Met USM req's in science	1.88***	[1.54, 2.30]	0.93	[0.71, 1.23]	1.24	[0.99, 1.56]
Met USM req's in foreign language	1.57***	[1.34, 1.84]	1.00	[0.87, 1.14]	1.36**	[1.13, 1.64]
CTE pathway completed	1.61***	[1.26, 2.05]	1.33***	[1.14, 1.56]	1.38***	[1.16, 1.64]
Non-cognitive characteristics						
Final GPA of ≥ 3.0	2.31***	[1.90, 2.81]	1.03	[0.82, 1.30]	1.55***	[1.27, 1.90]
Average daily attendance rate[b]	3.06***	[2.35, 3.98]	1.26***	[1.18, 1.35]	1.68***	[1.49, 1.90]
Numb. school changes[b]	0.96	[0.82, 1.13]	0.89***	[0.84, 0.95]	0.93	[0.86, 1.00]
Numb. Qs worked in 12th grade[b]	1.13*	[1.03, 1.24]	2.11***	[1.96, 2.28]	1.50***	[1.38, 1.62]
Demographic control variables						
Male	0.88	[0.74, 1.05]	1.05	[0.91, 1.20]	0.75***	[0.66, 0.85]
Black[a]	1.66**	[1.21, 2.27]	1.21	[0.93, 1.57]	2.28***	[1.55, 3.36]
Latinx	0.60*	[0.37, 0.99]	1.01	[0.72, 1.41]	0.62	[0.37, 1.04]
Free/reduced-price meal eligible	0.71***	[0.62, 0.81]	1.20	[0.92, 1.57]	0.95	[0.79, 1.15]
Special education	0.75	[0.55, 1.01]	0.72***	[0.63, 0.83]	0.61***	[0.46, 0.80]
English language learner	3.15***	[1.77, 5.62]	0.60*	[0.37, 1.00]	1.62*	[1.11, 2.35]
Homeless services	0.88	[0.53, 1.48]	0.73*	[0.55, 0.97]	0.87	[0.65, 1.15]

Notes. Outcome reference category is 'More than 2 quarters with no record of enrollment or Maryland workforce activity'. Model additionally include controls for high school type and graduation year.

RRR: Relative Risk Ratio

[a] Reference group is white or Asian. [b] Variable transformed into a z-score.

* p<0.05, ** p<0.01, *** p<0.001

Predicting Inconsistent Activity after High School

The data also presented an opportunity to examine what factors predict inconsistent activity after high school graduation. The four outcomes were collapsed into two groups, 1) spending three or more quarters neither enrolled nor working, and 2) college and/or workforce persistence. Being in the inconsistent activity category was regressed on all predictor variables in a logistic regression model. Results are presented in Table 3.

Table 3.
Logistic Regression of Fewer than 14 Quarters of College Enrollment or Workforce Participation on Demographic, Academic, and Non-Cognitive Readiness Indicators, Baltimore City Public Schools Graduating Classes of 2011-2013

	Odds ratio [95% C.I.]
Academic characteristics	
HSA score, Algebra and Biology	0.98 [0.91, 1.06]
HSA score, English and Gov't	0.88** [0.81, 0.94]
Took ≥1 AP course	0.71*** [0.62, 0.81]
Met USM req's in math	0.78*** [0.69, 0.88]
Met USM req's in science	0.66*** [0.53, 0.82]
Met USM req's in foreign language	0.80*** [0.72, 0.88]
CTE pathway completed	0.74*** [0.64, 0.85]
Non-cognitive characteristics	
Final GPA of ≥ 3.0	0.61*** [0.53, 0.70]
Average daily attendance rate[b]	0.69*** [0.64, 0.75]
Numb. school changes[b]	1.08** [1.02, 1.14]
Numb. Qs worked in 12th grade[b]	0.57*** [0.53, 0.62]
Demographic control variables	
Male	1.07 [0.95, 1.21]
Black[a]	0.66*** [0.53, 0.82]
Latinx	1.32 [0.98, 1.78]
Free/reduced-price meal eligible	1.13 [0.98, 1.30]
Special education	1.41*** [1.26, 1.59]
English language learner	0.88 [0.68, 1.14]
Homeless services	1.30* [1.06, 1.60]

Notes. Model Pseudo R-squared = 0.19. Models additionally include controls for high school type and graduation year.

[a] Reference group is white or Asian. [b] Variable is a z-score transformation.

* p<0.05, ** p<0.01, *** p<0.001

Higher levels on nearly all the academic and non-cognitive variables significantly decreased the odds of inconsistent college or work activity during the first four years after high school

graduation. The sole exception was the number of school changes, where each transfer was associated with 8% higher odds of inconsistent activity. Factors associated with the largest decrease in odds were the non-cognitive variables, especially finishing high school with a GPA of 3.0 or higher and working during 12th grade. Each quarter graduates had worked was associated with 43% lower odds of being in the inconsistent pathway. Among the academic variables, completing USM science requirements had the strongest predictive relationship, along with taking at least one AP course (predicting 34% and 29% lower odds, respectively).

It is also notable that among the demographic and educational characteristic control variables, receiving special education services significantly increased the odds of inconsistent activity after high school, with 41% higher odds relative to non-special education students.

Summary of Findings

The findings of this study suggest that for a population of urban, predominantly lower-income graduates, different factors are associated with college persistence and workforce persistence over the first four years after high school. Specifically, graduates who immediately entered the workforce after graduation but were otherwise similar on observable variables to graduates who enrolled in college, were more likely to be stably employed over the next four years if they had completed a CTE pathway, had not been mobile during high school, worked in 12th grade, and had regularly attended school throughout high school. Somewhat surprisingly, persistence in the workforce was largely unrelated to their academic accomplishments, such as final GPA, assessment scores, and advanced course-taking. However, for college-bound graduates, as well as those who worked while enrolled or oscillated between college and work, such academic achievements were strongly related to persistence in formal activity, along with strong attendance and completing a CTE pathway in high school.

Both academic and non-cognitive characteristics were associated irregular participation in college or work after high school graduation. In particular, higher assessment scores, completing USM course requirements, AP course-taking, and CTE pathway completion all predicted lower odds of spending nine or more months disengaged from both college and the workforce. In addition, a 3.0 GPA, regular school attendance, and working senior year reduced the odds of disengagement from college and work. Changing high schools between 9th and 12th grade increased the odds of inconsistent formal activity, as did receiving special education or homeless services.

Discussion

Clearly, graduating from high school is an important milestone in the transition to a successful adulthood, and many graduates overcome great odds to get there. In Baltimore city, the current ninth grade cohort graduation rate is 71%, so the individuals featured in this study

are undoubtedly resilient and possess a wealth of strategies, knowledge and capital necessary to be successful. What comes after high school graduation is not at all straightforward, however, especially among low-income graduates who often confront greater barriers to college enrollment than their wealthier peers. The current study provides a small window into the pathways taken by a population of largely minority and low-income graduates, showing that approximately half took fairly uncertain steps to a gainful adulthood after high school. Although high schools are assuredly responsible for supporting students toward graduation, preparing them for college and career after high school has only more recently become a central mandate. Preparing students to transition to college is sensible, but given the exigencies of some students' lives and potentially different priorities, what can high schools do to ensure graduates' success if they are not bound for college?

Policies have more or less merged 'career' and 'college' readiness into a single construct, based on the notion that traditionally, college experience leads to a career. However, whether a job is a career lies in the interpretation of the worker, and their perception of its potential for long term satisfaction, stability, earnings and meaningfulness. As a result, it is impossible to know whether the graduates in this study who were employed were engaged in careers, or if they were simply working a job. However, what is possible to discern from the findings is that some graduates were better prepared for stable employment and/or college persistence.

Although 'career and college readiness' emphasizes both academic and non-academic competencies, the results suggest that stable employment was not related to academic factors as much as to work experience, persistent school attendance, and career and technical education. To the extent that college experience is necessary to achieve a career after some postsecondary education, then academic factors are critical. Yet for careers that do not entail further education, academic proficiency and advanced course-taking do not seem to be predictive of remaining employed, at least during the trajectory encompassed by the first four years after high school.

This finding is significant, in that high schools can support students who prioritize working over further education by providing rich work-based learning opportunities, career-specific training, but perhaps just as importantly, by encouraging everyday attendance. Such work-based experiences prepare students for the culture of the workplace, provide a record of work experience, and expose them to opportunities that build the all-important 'soft skills' or non-cognitive traits. Such traits have long been known to have tremendous positive effects on educational attainment (Bowles & Gintis, 1976; Farkas, 1996) and on lifetime earnings (Heckman & Rubenstein, 2001). Indeed, students' attendance rate is a highly useful proxy for stability and conscientiousness, which are traits that employers rank among the most desirable for employees (Sackett & Walmsley, 2014).

Limitations

This study is not without a number of limitations. First, the primary independent variables are imperfect. The proxies for academic characteristics are summary measures of completion and lack information about performance. Further, the HSA assessments are end-of-course assessments and may not capture subject-area proficiency as much as curriculum knowledge, and in addition, scores may be subject to test-retest bias, since students can take the HSA more than once. Second, the non-cognitive measures available to investigate were limited. Although final GPA, attendance, school mobility, and working in 12th grade approximate traits such as effort, diligence, and stability, ideally the study would be able to include a number of personal traits identified in other research such as curiosity and openness to experience, leadership, interpersonal skills, etc. (c.f., Farkas, 2003), which have been found highly predictive of later success in school and the labor force.

Third, the DoL data regarding workforce activity is limited to work in Maryland and excludes federal employees, self-employment, and military enlistment. Military activity is not likely to account for many City Schools graduates, however. According to other Baltimore City Schools data, approximately two dozen students per graduating cohort commit to enlistment in the military before high school graduation; yet, later enlistments cannot be observed in MLDS data. It is further impossible to account for workforce activity among graduates moving out of Maryland after high school, perhaps for college. As a result, estimates of the share who are only enrolled and not working may be artificially high. Finally, the most significant data limitation in this study is the inability to observe informal work and self-employment. Additional research – including qualitative investigation -- is needed to understand the post high school pathways of graduates who do not enroll in college but are engaged in such 'off the books' or entrepreneurial activity.

It is also important to acknowledge that this study is correlational and cannot yield any causal conclusions about the effect of high school factors on later persistence. There are definitely unobservable differences and selection effects between students who, for instance, took four years of math, and those who did not. Most importantly, many students in the current study simply did not have the opportunity to amass such academic achievements due to stark resource differences between high schools in Baltimore. Due to admission requirements at some schools, students were different on both observed and unobserved variables before high school began. These differences are expected to have also impacted their postsecondary outcomes. As a result, the word 'predictor' is used only in a statistical modeling context.

Policy Implications

If the findings concerning different predictors of college and workforce persistence are replicable elsewhere, it suggests that requiring an inordinate amount of academic accomplishments for graduation, such as advanced course-taking in core academic subjects,

may be detrimental for high school students without goals of going to college. Failure to pass four years of both math and science and multiple courses in foreign language – which many states are moving to require for graduation -- may discourage or prevent some students from graduating, and the lack of a high school diploma certainly closes more doors than not going to college. In sum, curricular flexibility and a consideration of what can tangibly prepare students for where they hope to go next in life is needed. To continue to push a 'college for all' agenda that assumes all young adults need to immediately go to a four-year college after high school means ignoring the reality of a highly diversified labor market.

Future Research

Future research could build on the current study by replicating the analysis with a more diverse sample, in other cities, as well as using nationally representative data. And as acknowledge above, this study is a precursor to other analyses that could operationalize success in a way other than persistence in college or the workforce, e.g., by examining earnings, or job quality or satisfaction. In addition, given the significant relationship between CTE pathway completion, examining the relationship between specific career pathways and later outcomes would be valuable, since there is a great deal of variation within and between the career clusters associated with each pathway.

Conclusion

This study is the first to simultaneously examine whether the same factors predict persistence in college and career and is an important first step in determining whether 'career and college readiness' warrants a single definition. It used an exploratory approach to examine how high school factors predicted persistence in college, the Maryland workforce, or lack of attachment to either destination, during the first four years after graduation for three consecutive cohorts of graduates from Baltimore City Schools. Consistent with the literature on college readiness, academic proficiency, completing advanced course work, and proxies for non-cognitive characteristics (i.e., attendance, school stability, and final GPA) positively relate to college persistence, as well as persistence in a pathway entailing college and/or work. In contrast, only the non-cognitive variables of attendance and school stability, in addition to completing a CTE pathway, predicted persistent workforce participation. Both academic and non-cognitive characteristics had strong relationships with a lack of persistence in either destination, a pathway that may reflect graduates 'meandering' during early adulthood. Future research would benefit from an examination of whether these relationships are the same for a more diverse or more generalizable sample.

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Appendix A

Table A1

Means (Standard Deviations) for Dependent and Independent Variables for Total Analytic Population, Baltimore City Schools Graduates, Classes of 2011-2013

	Mean (SD)
Demographic/Service characteristics	
Male	.44 (.50
Black	.91 (.29)
White or Asian	.07 (.26)
Latinx	.02 (.14)
Free/reduced-price meal eligible	.89 (.32)
Special education	.12 (.32)
English language learner	.02 (.15)
Homeless services	.04 (.19)
Academic characteristics	
HSA score, Algebra and Biology	411.22 (24.75)
HSA score, English and Gov't	402.98 (25.41)
Took $\geq$1 AP course	.22 (.41)
Met USM req's in math	.20 (.40)
Met USM req's in science	.07 (.25)
Met USM req's in foreign language	.25 (.44)
CTE pathway completed	.23 (.42)
Non-cognitive characteristics	
Final GPA of $\geq$ 3.0	.18 (.39)
Average daily attendance rate	89.37 (9.71)
Numb. school changes	.51 (.97)
Numb. Qs worked in 12th grade	.95 (1.41)
Control variables	
2011 cohort	.34 (.47)
2012 cohort	.34 (.47)
2013 cohort	.33 (.47)
High school type	
Entrance criteria	.24 (.42)
CTE with entrance criteria	.15 (.36)
Traditional	.41 (.49)
Charter/contract/transform	.17 (.37)
Special placement	.04 (.20)