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The Effects of Alignment of Educational Expectations and Occupational Aspirations on Labor Market Outcomes: Evidence from NLSY79

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ABSTRACT

Using data from the National Longitudinal Survey of Youth of 1979, this article examines the relationship between adolescents' educational and occupational expectations, and how they correspond to their subsequent labor market outcomes in adulthood. We show that over-aligned adolescents, those who expect to obtain more education than is necessary for their desired occupation, are predicted to have hourly wages 30% higher than under-aligned adolescents, whose educational expectations are lower than their occupational expectations. The misalignment of educational and occupational expectations is not related to the probability of being employed through individuals' early twenties to late forties. However, over-aligned individuals are predicted to have more prestigious occupations than under-aligned individuals, suggesting that those in the over-aligned group sorted into better jobs over their careers. We also show that the effects of misaligned expectations on labor market outcomes change over the years, indicating that having high and aligned expectations are even more important for labor market outcomes than previously estimated.

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Introduction

The transition from high school into adulthood can be difficult for adolescents as they make sense of their options for schooling and work. Young people must decide how much education they will attain and in what field of study to lead them toward a desired occupation. These decisions are even more important as occupations become more specialized. However, many high school students lack a clear vision for where they hope to be decades later, even though the decisions they make for their very near futures have important implications for longer-term employment outcomes. Obtaining a bachelor's degree can lead to a substantial wage premium and open up a variety of job opportunities (Acemoglu & Autor, 2011; Bound & Turner, 2011; Heckman, Lochner, & Todd, 2006; Oreopoulos & Petronijevic, 2013; Zimmerman, 2014). But, along

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with the many benefits of acquiring additional education, there can also be substantial costs, both financial and otherwise.

High school students who know what career they want and what education they need for that career are said to have aligned ambitions (Schneider & Stevenson, 1999). The goal of this article is to analyze the importance of having aligned educational expectations and occupational aspirations in high school for determining a variety of labor market outcomes in adulthood. Previous studies on this topic have shown the relationships between alignment of educational expectations and occupational aspirations during the early part of workers' careers (Sabates, Harris, & Staff, 2011; Schmitt-Wilson & Faas, 2016). It is unclear to what extent these effects continue later into adulthood or how well earnings in one's twenties and early thirties represent *lifetime earnings* given life-cycle variation in this relationship (Haider & Solon, 2006), therefore we estimate the relationship between alignment and mid-career earnings.¹ Using data from the National Longitudinal Survey of Youth of 1979 (NLSY79), we measure survey participants' educational expectations and occupational aspirations and track them from high school until the age of 49, estimating the association between alignment in educational expectations and occupational aspirations and wages, weeks worked, employment, and occupational prestige.

Existing literature on higher education and stratification suggests that individual's educational and occupational expectations are shaped by family resources and that these expectations impact short-term outcomes such as college attendance. This article confirms previous findings on the relationship between family resources and alignment and extends the prior research by showing that the alignment of expectations has long-term implications on labor market outcomes. In addition, we find that it is over-alignment rather than higher educational expectations alone that has positive persistent effects on labor market outcomes. Results show that over-aligned individuals are predicted to have higher wages and more prestigious occupations regardless of expected education and actual completed education.

Review of the literature

Educational expectations

The financial benefits of obtaining a bachelor's degree are well documented, with a wage premium of roughly 60% (Bureau of Labor Statistics, 2017; Daly & Bengali, 2014). Education is also associated with a variety of other positive outcomes such as improved health (e.g. Conti, Heckman, & Urzua, 2010), increased civic participation (e.g. Dee, 2004), and lower unemployment (Bureau of Labor Statistics, 2017). Education is also a means to develop human capital by obtaining both general and specialized skills (Becker, 2009).

Efforts designed to assist students in continuing their education after high school often cite such positive outcomes, especially as they relate to traditionally underrepresented groups in occupations that require advanced degrees (e.g. Goldrick-Rab, Harris, Kelchen, & Benson, 2012; Hoxby & Turner, 2013; Page & Scott-Clayton, 2016). Beyond the benefits of actually obtaining postsecondary degrees, simply having accurate educational expectations is associated with a variety of positive outcomes including increased likelihood of enrolling in college, doing so immediately after high school, and doing so at a four-year institution (Morgan, Leenman, Todd, & Weeden, 2013).

Adolescents' expectations about their educational attainment have increased over time (Goyette, 2008; Reynolds, Stewart, MacDonald, & Sischo, 2006; Schneider & Stevenson, 1999), especially among disadvantaged and racial and ethnic minority students (Jacob & Linkow, 2011; Schneider & Saw, 2016). In 2012, over 60% of eleventh grade students expected to attend postsecondary schools to obtain a bachelor's or professional degree (Schneider & Saw, 2016). However, some argue that the educational expectations of today's adolescents are too high, and that going to college has become less about obtaining a degree that might be useful for a particular occupation and more about completing a necessary step for making the transition to adulthood (Goyette, 2008; Reynolds et al., 2006). A substantial portion of workers with bachelor's degrees is over-qualified for their jobs, with the rates being higher for African Americans and Hispanics than for whites (Rose, 2017). Others show that the number of jobs that require a bachelor's degree far outpace the number of degrees obtained and are much smaller than the number of adolescents who expect to obtain a college degree (Carnevale, Smith, & Strohl, 2013).

Although there are many benefits to increasing the educational attainment of young people, including those that extend beyond improved labor market outcomes (Conti et al., 2010; Dee, 2004; Hout, 2012; Oreopoulos & Salvanes, 2011), many students pursue secondary education with the hope of improving their employment prospects. However, pursuing additional education without also incorporating information about desired occupations can lead to personal costs, which have increased over the last two decades (Ma, Baum, Pender, & Welch, 2017; National Center for Education Statistics, 2014). Complicating all of this is uncertainty about what the career landscape will look like in the future.

Occupational aspirations

Having high and certain occupational aspirations has been linked to higher earnings in adulthood, decreased unemployment, improved stability in employment, and increased educational attainment (Sabates, Gutman, & Schoon, 2017; Sabates et al., 2011; Staff, Sabates, Harris, & Briddell, 2010; Yates, Harris, Sabates, & Staff, 2011). Adolescence is a time when young

people explore the possible roles they may take on in adulthood. Although some degree of uncertainty with regard to occupation is to be expected, there is a difference between considering and exploring different roles and aimlessly making one's way from adolescence into the working world (Staff et al., 2010). We view occupational aspirations as an important condition during adolescence that is distinct from an actual career decision. However, the changing career landscape that today's adolescents face makes forming occupational aspirations difficult in high school without guidance from parents and counselors and information about the types of careers students may want to consider, especially given the pace of technological change.

Stratification

The link between a person's social origins and characteristics and their educational expectations and attainment is well documented (Blau & Duncan, 1967; for a review, see Grodsky & Jackson, 2009). Factors such as race/ethnicity, socioeconomic status, parental education level, and parental occupation are related to educational attainment including through their influence on students' educational expectations and occupational aspirations (Goyette, 2008; Schneider & Stevenson, 1999; Teachman & Paasch, 1998).

This stratification is concerning because as students' educational expectations have risen (Goyette, 2008; Reynolds et al., 2006; Schneider & Saw, 2016), the barriers to social mobility through additional education persist (Chetty, Hendren, Kline, & Saez, 2014). Students from families with lower income or less parental education are less likely to enter and stay in 4-year colleges (Goldrick-Rab, 2006), and are more likely to "undermatch" in their college enrollment due to lack of knowledge about which institutions they are competitive for and how much such an institution would cost (Dillon & Smith, 2017; Hoxby & Avery, 2012). Despite missing out on eventual pecuniary benefits that selective institutions might offer, some less-selective institutions have proven to be particularly successful at promoting social mobility (Chetty, Friedman, Saez, Turner, & Yagan, 2017).

Conceptual framework

Earlier sociological studies treated educational expectations and occupational aspirations as separate (e.g. Sewell, Haller, & Oblendorf, 1970), but as adolescents' educational expectations have risen, Schneider and Stevenson (1999) developed the concept of aligned educational expectations and occupational aspirations to reexamine the relationships. Alignment refers to when the amount of education an adolescent expects to complete matches the amount of education required for their desired occupation. Aligned educational expectations and occupational aspirations are important in developing coherent life plans, allowing for a smooth

transition into their career of choice. Misalignment of educational expectations and occupational aspirations can take two forms. Adolescents who are under-aligned have occupational aspirations that require more education than they expect to need. These students may not obtain the necessary education for their desired occupation, leading to disruption in occupation and wage attainment. Over-aligned adolescents expect to obtain more education than is necessary for their desired occupation. Although the wage returns for additional education are positive, those with over-aligned educational expectations and occupational aspirations may find themselves underemployed or in a career that does not match the one they envisioned as an adolescent.²

The concept of alignment was extended by Sabates et al. (2011) who defined two types of alignment. Adolescents who desired professional careers that required additional postsecondary education, and who had appropriately high educational expectations are deemed high-aligned. Adolescents whose occupational aspirations were low, but whose educational expectations were appropriately low as well are deemed low-aligned. As Sabates et al. suggest, there may be differences in the outcomes of students who are aligned but pursue different levels of education and career status.

In addition to information about educational expectations and occupational aspirations, scholars recognize the importance that variables such as academic ability, family income, parental education, and race/ethnicity play in attainment and stratification. Early work showed that educational expectations and occupational aspirations mediated the influence of these factors, although they are still predictive of attainment (e.g. Jencks, Crouse, & Mueser, 1983). As such, we include cognitive skills, noncognitive skills, and family background variables in our models to account for their influence on outcome measures.

The current study

The alignment of occupational aspirations and educational expectations is important for a variety of later outcomes. Schneider, Kim, and Klager (2017) showed that both educational expectations and occupational aspirations co-develop during high school and that the probability of enrolling in postsecondary institutions is lower for under-aligned high school students compared to their aligned peers. Sabates et al. (2011) found that British adolescents that had misaligned or uncertain educational expectations and occupational aspirations had less stability in employment and lower educational attainment, leading to lower wages at age 34. Likewise, Schmitt-Wilson and Faas (2016) looked at educational attainment, underemployment, and wages at age 26 and found that under-alignment was a significant negative predictor of educational attainment and over-alignment was a significant positive predictor of higher income.

Having misaligned educational expectations and occupational aspirations as one transitions from high school into adulthood may lead to a rocky start to

one's early career, but one that people may tend to recover from eventually. Likewise, the effects of having misaligned educational expectations and occupational aspirations may extend further into adulthood, causing long-term or even permanent penalties to wages and other labor market outcomes. Although alignment of educational expectations and occupational aspirations in high school is predictive of future labor market outcomes, limited evidence currently exists that allows us to track outcomes into later adulthood. Many studies have documented that the association between current and lifetime earnings changes over the life-cycle. Findings indicate that using earnings in the twenties causes a large attenuation bias when proxying for lifetime earnings. Earnings during the early thirties and the mid-forties minimize this bias (Björklund & Jäntti, 1997; Böhlmark & Lindquist, 2006; Brenner, 2010; Haider & Solon, 2006).

Occupational prestige is a labor market outcome that can have impacts beyond those measured by wages, including fringe benefits such as pensions, stock options, paid leave, and health insurance (Oreopoulos & Salvanes, 2011) and other benefits such as improved health outcomes (Fujishiro, Xu, & Gong, 2010). Occupational prestige may also serve as a better indicator of permanent economic status than wages measured at a particular point in time (Zimmerman, 1992). Early work showed that higher educational expectations and occupational aspirations translated into more prestigious jobs in early adulthood (Sewell & Hauser, 1975), but little is known about how alignment of educational expectations and occupational aspirations in high school translates into earnings and occupational prestige later in life.

We investigate the effects of alignment and misalignment of educational expectations and occupational aspirations in high school on labor market outcomes into workers' forties, using NLSY data by addressing the following research questions:

- (1) What is the relationship between alignment of educational expectations and occupational aspirations and early- and mid-career earnings?
- (2) What is the relationship between alignment and labor market outcomes such as the number of weeks worked, employment status, and occupational over-qualification?
- (3) What is the relationship between alignment and occupational prestige?
- (4) How do these relationships (from research questions 1–3) vary by race/ethnicity and gender?

Sample and data description

The principle source of data for this study is the NLSY79, a longitudinal study that surveyed a nationally representative sample of over 12,000 young men and women between the ages of 14 and 22. The interviews were first conducted in 1979 and followed up annually until 1994 and biennially thereafter. Our

analysis uses data through the 2012 follow-up. The data provide educational expectations and occupational aspirations for high school students, comprehensive individual and family characteristics, as well as postsecondary degree information and a variety of labor market outcomes.

A. Measurement of Alignment

In NLSY79, participants were asked “As things now stand, what is the highest grade or year you think you will actually complete?” in the 1979 and 1982 surveys. We categorized educational expectations into four groups: high school or lower for level 1, associate degree for level 2, bachelor’s degree for level 3, and advanced/graduate degree for level 4. NLSY79 assesses occupational aspirations by asking “What kind of work would you like to be doing when you are 35 years old?” in the 1979 and 1982 surveys. The occupations were categorized using 1970 census 3-digit codes.

The required education level for each occupation category was determined using the Occupational Information Network (O*NET). O*NET is a survey administered by the U.S. Department of Labor to a random sample of U.S. workers in each occupation category. We use the earliest survey, from 1998, to reflect the task content of occupations for the NLSY79 participants.³ The required education level was categorized as high school diploma or lower, associate degree, bachelor’s degree, and graduate degree.

Following methods in Schneider et al. (2017), the alignment measure examines whether respondents’ educational expectations match the required level of education for the desired occupation. Over-aligned is a dichotomous variable that equals 1 if the expected education level is greater than the required education level and the under-aligned variable is defined as the opposite. Participants who matched expected education and education required for their desired occupation are divided into two groups as described by Sabates et al. (2011): high-aligned refers to a situation where both educational expectations and required education level are associate degree or higher and low-aligned corresponds to participants who are not seeking postsecondary education and aspire for nonprofessional jobs.

B. Postsecondary Degree

College degree completion in NLSY79 is measured using the highest degree received as of May 1, 2012, and collapsed into four categories: high school degree or less, associate degree, bachelor’s degree, and professional or graduate program.

C. Labor Market Measures

We explore several labor market outcomes from NLSY79. First, wages are the hourly rate of pay for participants' main job and adjusted to 2000 dollars using the Consumer Price Index (CPI). In the analysis, we use the natural logarithm of the wages. Since the survey has been conducted biennially since 1994, wages for missing survey years are calculated to have the average values of the adjacent survey years. For example, the wage in 1995 is the average of wages from 1994 and 1996. Then for years when wage is missing, we linearly interpolate the wage using wages in two nearby years. Following Altonji, Bharadwaj, and Lange (2012) and Deming (2017), we drop real hourly wage values that are less than \$3 or greater than \$200 per hour. Employment is measured in the current survey year, whereas the number of weeks worked is measured from the past calendar year. Occupational prestige is measured using scores taken from the Duncan Socioeconomic Index, a composite of occupational prestige, income, and education requirements (see Kahn, 2010). Labor market measures are restricted to observations with a valid wage and individuals who are not enrolled in postsecondary education.

D. Cognitive Skills

Cognitive ability is well established as a strong predictor of educational attainment and labor market outcomes such as wages (e.g. Cawley, Heckman, & Vytlacil, 2001; Heckman, Stixrud, & Urzua, 2006). In NLSY79, the Armed Forces Qualifying Test (AFQT) is used to proxy for ability (or cognitive skills), which is further adjusted by age. The AFQT has been used extensively as a measure of cognitive skills in the literature (Cameron & Heckman, 1998, 2001; Ellwood & Kane, 2000; Groves, 2005; Heckman, Stixrud et al., 2006; Neal & Johnson, 1996). We use AFQT measures from when the participants were in high school, avoiding a reverse causality problem with using a measure from after they began post-secondary education.

E. Non-cognitive Skills

Social scientists have recently focused a great deal of attention on certain non-cognitive skills, such as persistence, goal-setting, and motivation, finding that such factors can play an important role in success in a variety of pursuits (e.g. Deming, 2017; Heckman & Kautz, 2012; West et al., 2016). NLSY79 contains several measures of non-cognitive skills including the Rotter Locus of Control Scale, collected in 1979, and the Rosenberg Self-Esteem Scale, administered in 1980. The Rotter Scale is a four-item, abbreviated version of the Rotter Internal External Locus of Control Scale and is designed to measure the extent to which individuals believe they have control over

their lives through self-motivation or self-determination (internal control) as opposed to the extent that environmental factors such as luck or fate control their lives (external control). Cebi (2007), using NLSY data, found that locus of control had no effect on students' occupational aspirations and educational attainment but did impact future wages. Other work has found the opposite – less control affects educational attainment (Coleman & DeLeire, 2003). Following Cebi's (2007) approach, high scores indicate greater internal control, whereas low scores indicate greater external control.

We use the 10-item Rosenberg Self-Esteem Scale, which describes the degree of approval or disapproval toward oneself. Higher scores designate higher self-esteem. Following Deming (2017), we normalize both the Rotter Scale and Rosenberg Self-Esteem variables to have a mean of 0 and a standard deviation of 1. Then, we take the average of the two measures for each participant and re-standardize them so that non-cognitive skills and cognitive skills have the same distribution.

F. Demographic and Family Background Characteristics

We use demographic measures including gender and race/ethnicity. In NLSY79 the race/ethnicity variable consists of non-Hispanic whites, non-Hispanic blacks, and Hispanics. We use non-Hispanic whites as the reference group. Age and age-square variables are included to control for any age differences. Parental education equals one if a parent has a bachelor's or advanced degree. We take the log of family income averaged between 1978 and 1982 and adjusted to 2000 dollars using the CPI.

Descriptive analysis

In order to focus on the effects of alignment in adolescence on labor market outcomes, our analytic sample is restricted to those who were enrolled in high school either in May 1979 or in 1982.⁴ We drop individuals who do not have an AFQT score, resulting in an analytic panel of 4,381 individuals.⁵

Table 1 presents the descriptive statistics by alignment group. Out of 4,381 observations, 44% have aligned educational expectations and occupational aspirations (60% of the aligned individuals are high-aligned; 40% are low-aligned). As high as 22% of the participants have over-aligned expectations and aspirations. The remaining 34% of the individuals are under-aligned.⁶

The descriptive statistics show that on average, over-aligned and high-aligned respondents come from higher income families with more educated parents and have higher levels of cognitive and non-cognitive skills than those who are under-aligned or low-aligned. These results add to the existing literature on higher education stratification in that family characteristics are associated with educational alignment. The fraction of respondents who

Table 1. Summary statistics.

	All Sample	Over- Aligned	Under- Aligned	High- Aligned	Low- Aligned
Demographic:					
Female	46%	55%	36%	45%	58%
White	49%	50%	47%	53%	44%
Black	33%	31%	33%	31%	38%
Hispanic	18%	19%	20%	16%	18%
Family Background:					
Parental Ed	18%	30%	8%	30%	3%
Family Income	443.8	506.9	394.4	511.3	361.5
Skills:					
Cognitive	0.08	0.41	−0.14	0.47	−0.47
Non-cognitive	−0.12	0.12	−0.27	0.10	−0.44
Degree:					
High School or Less	69%	53%	83%	49%	90%
Associate	9%	11%	8%	11%	5%
Bachelor	16%	23%	6%	30%	3%
Master	5%	10%	2%	9%	1%
Professional	1%	4%	0%	1%	0%
Graduate Program	7%	14%	2%	10%	1%
Labor Market Outcomes at Age 35					
Wage	16.13	20.53	14.23	17.76	11.7
Employed	81%	80%	80%	87%	76%
Out of Labor Force	13%	13%	15%	10%	14%
Worked 52 Weeks	42%	42%	42%	44%	42%
Weeks Worked	41.7	44.02	40.51	44.62	36.59
Over-Qualified	63%	71%	54%	72%	56%
Observations	4,381	971	1,499	1,141	770

The entries are unweighted means of high school students in the 1979 or 1982 survey. Parental Ed is coded one if any parent has a bachelor's degree or advanced degree and zero otherwise. Family income is averaged between 1978 and 1982, log-transformed, and adjusted to 2000 dollars. Cognitive skills are measured by AFQT and are normalized to have a mean of 0 and a standard deviation of 1. Non-cognitive skills are the normalized average of the Rotter Scale and Rosenberg Self-Esteem scores. Hourly wages are adjusted to 2000 dollars. The unit of observation is the individual.

completed a bachelor's or advanced degree is 51% for over-aligned, 40% for high-aligned, 9% for under-aligned, and 5% for low-aligned. The average hourly wage at 35 (adjusted to 2000 dollars) is \$20.53 for over-aligned, \$17.76 for high-aligned, \$14.23 for under-aligned, and \$11.7 for low-aligned. The descriptive statistics indicate that high school students from disadvantaged backgrounds tend to be under-aligned, have lower college enrollment rates, and less favorable labor market outcomes.

Empirical results

To examine the relationship between alignment of educational expectations and occupational aspirations and labor market outcomes, we estimate the following baseline model:

$$Y_i = \beta_0 + \beta_1 \text{Overalign}_i + \beta_2 \text{Highalign}_i + \beta_3 \text{Lowalign}_i + \gamma X_i + \epsilon_i \quad (1)$$

where Y_i is the outcome variable for student i and \mathbf{X}_i is a vector of individual-level covariates.⁷ Since the under-aligned variable is omitted, β_1 , β_2 and β_3 capture the difference between those groups and the under-aligned group. As college degree completion is a choice variable and is an outcome of alignment measures (see results in Table 2), which also influence earnings, we do not include degree information as a control variable to avoid endogeneity (Heckman, Lochner, et al., 2006).⁸

Degree completion

Although our primary interest lies in labor market outcomes, we begin by examining the relationship between alignment in expectations and aspirations in 9th grade and educational attainment, since educational attainment is an important step for determining future labor market outcomes. In Table 2 we present results from regressions of degree completion on alignment in high school. Each model is estimated separately by logit regression, and marginal effects are reported. Estimates in column 1 indicate that, after controlling for a set of covariates \mathbf{X}_i , the probability of obtaining a high school diploma, GED, or dropping out and not enrolling in any postsecondary institution is statistically significantly higher for low-aligned students.⁹ These students are six percentage points more likely to discontinue schooling than under-aligned students. The negative estimated coefficients on over-aligned and high-aligned (15 and 17 percentage points, respectively) suggest that these participants are much more likely to pursue postsecondary education than under-aligned students.

In terms of 2-year college completion probability, coefficient estimates in column 2 show that, compared to under-aligned participants, low-aligned participants are five percentage points less likely to receive a 2-year degree. Over-aligned and high-aligned students are 11 and 15 percentage points more

Table 2. Estimated effect of alignment on degree completion.

VARIABLES	HS or Less (1)	2-year College (2)	4-year College (3)	Grad School/Professional (4)
Over-aligned	−0.148*** (0.018)	0.008 (0.013)	0.105*** (0.017)	0.148*** (0.016)
High-aligned	−0.174*** (0.016)	0.017 (0.013)	0.150*** (0.016)	0.165*** (0.015)
Low-aligned	0.061* (0.026)	−0.051** (0.018)	−0.044 (0.030)	−0.029 (0.027)
Observations	2,552	2,552	2,524	2,524

The dependent variable is a measure of whether the individual received a degree in high school or less in column 1, two-year college in column 2, four-year college in column 3, and advanced degree in column 4 in the unweighted sample. Each regression also includes additional controls specified in Equation (1). See notes to Table 1 for variable definitions. Each model is estimated by logit regression and marginal effects are reported. Robust standard errors are in parentheses.

⁺ $p < 0.10$. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

likely to graduate from 4-year colleges (column 3), suggesting that high school students who had higher levels of educational expectations are more likely to attain degrees in postsecondary institutions. The effects of over-alignment on the probability of degree completion are stronger for advanced degrees (column 4), where we see the estimate increase from .105 to .148.

Wages

Column 1 of Table 3 presents OLS estimates in which the dependent variable is the log of real average mid-career wages (from ages 33 to 45). The coefficient for over-aligned, .113, indicates that over-aligned individuals earn an average of 11% more during the mid-career than under-aligned individuals. This suggests that having over-aligned educational expectations and occupational aspirations in high school is related to increases in lifetime wages. High-aligned individuals also marginally significantly higher wages, 4%, than under-aligned individuals. These average estimates are robust to changes in age range specifications.

Next, we examine the effects of misalignment on wages over the life-cycle. We estimate regressions with the same specifications used in column 1 of Table 3 but at different ages for the dependent variable. Results present clear evidence that the effect of alignment on wages changes over the life-cycle. For example, on average, over-aligned high school students are predicted to have an hourly wage at age 26 that is 8% above that of under-aligned individuals as indicated by the coefficient of .084. The wage gap between over-aligned and under-aligned increases up to 14% by the end of the 30s and then steadily decreases to 11% at age 42 and to 7% at age 46 (not presented). High-aligned participants have higher hourly wages up to age 30 than under-aligned participants and indistinguishable wages afterwards.

Table 3. Estimated effect of alignment on wages over the life-cycle.

VARIABLES	Mid-Career (1)	Age 26 (2)	Age 30 (3)	Age 34 (4)	Age 38 (5)	Age 42 (6)
Over-aligned	0.113*** (0.026)	0.084*** (0.024)	0.104*** (0.027)	0.116*** (0.028)	0.135*** (0.031)	0.105** (0.033)
High-aligned	0.044+ (0.024)	0.068** (0.023)	0.085*** (0.025)	0.038 (0.027)	0.026 (0.029)	0.049 (0.030)
Low-aligned	-0.014 (0.025)	-0.001 (0.025)	-0.031 (0.025)	-0.007 (0.029)	0.021 (0.030)	0.017 (0.031)
Observations	2,986	2,888	2,822	2,796	2,693	2,523

The dependent variable is log of real hourly wages between 33 and 45 years old in column 1 and in corresponding ages in columns 2–5 in the unweighted sample. Each regression also includes additional controls specified in Equation (1). Robust standard errors are in parentheses.

+ $p < 0.10$. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

Sabates et al. (2011) used the British cohort born in 1970 and showed that individuals who were high-aligned at age 16 earned higher wages at age 34 than those in the under-aligned group. High-aligned men's wages were 14% above under-aligned men and for women the gap between high- and under-aligned was 17%. In the NLSY79 sample, we find that the hourly wage gap between high-aligned and under-aligned is 14% for men and 8% for women. In another study, Schmitt-Wilson and Faas (2016) used the National Longitudinal Study of 1988 (NELS:88) and presented similar results. Their estimates indicate that the over-aligned group had 5% higher income than aligned at age 26. As discussed above, due to the life-cycle bias, using income information from the 20s is likely to suffer from an attenuation bias, as we show in Table 3.

Other labor market outcomes

To understand why alignment in educational expectations and occupational aspirations is related to differences in wages, we estimate which other labor market outcomes are related to alignment measures. Now we use panel data to estimate the relationship between alignment and other outcomes over time. For an individual i at age j in year t , we estimate the following individual-year model:

$$Y_{ijt} = \beta_0 + \beta_1 \text{Overalign}_i + \beta_2 \text{Highalign}_i + \beta_3 \text{Lowalign}_i + \gamma X_{ijt} + \delta_t + \varphi_j + \epsilon_{ijt} \quad (2)$$

where Y_{ijt} is one of the following dependent variables: log wage, hourly wage, weeks worked per year, being employed, completing more education than is required for the occupation, and occupation prestige score. δ_t is year fixed effects and φ_j is age fixed effects. We focus on individuals between ages 23 and 49 and exclude observations when individuals are enrolled in school. Standard errors are clustered at the individual level.

Table 4 summarizes regression results for these labor market outcomes. Again, comparisons are made to under-aligned individuals. Columns 4 and 5 are estimated by logit regression and we report marginal effects. Results in columns 1 and 2 use non-imputed hourly real wages and are comparable to estimates in column 1 of Table 3.

Compared to under-aligned individuals, over-aligned and high-aligned individuals show higher wages. Column 1 of Table 4 provides evidence that wages for over-aligned are 10% higher, while high-aligned have wages nearly 7% higher. Similar patterns are shown for hourly wages in column 2. The next four columns report estimates of the baseline model for other labor market outcomes.

The relationship between alignment in high school and the number of weeks worked in column 3 is marginally significant at the 10% level for over-aligned individuals. Next, estimates in column 4 suggest that the probability of being employed is higher for over-aligned and high-aligned individuals by

Table 4. Estimated effect of alignment on labor market outcomes.

VARIABLES	Log Wages (1)	Hourly Wages (2)	Weeks Worked (3)	Employed (4)	Over-qualified (5)	Occupation Prestige (6)
Over-aligned	0.101*** (0.017)	2.056*** (0.324)	0.620 ⁺ (0.364)	0.024*** (0.006)	0.096*** (0.018)	3.433*** (0.426)
High-aligned	0.072*** (0.017)	1.046*** (0.299)	0.136 (0.339)	0.015** (0.005)	0.114*** (0.017)	2.906*** (0.415)
Low-aligned	-0.020 (0.017)	-0.037 (0.234)	-0.032 (0.432)	0.011* (0.005)	0.051** (0.018)	-0.461 (0.397)
Observations	42,857	42,857	52,970	34,757	29,944	36,243

The dependent variable is log of real hourly wages in column 1, real hourly wages in column 2, the number of weeks worked in column 3, whether an individual is employed in column 4, whether an individual completed more education than is required for the occupation in column 5, and occupational prestige scores in column 6 in the unweighted sample. Models 4 and 5 are estimated by logit regression and marginal effects are reported. Model 5 excludes observations prior to 1988. Observations are restricted to individuals who are not enrolled in schooling. Each regression also includes additional controls specified in Equation (2). Robust standard errors are in parentheses.

⁺ $p < 0.10$. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

roughly two percentage points. The effect is not meaningful in an economic sense as the sample average is 70%. Low-aligned individuals are roughly one percentage point more likely than under-aligned to be employed, although again this is not meaningful considering the sample average.¹⁰

Overall, results in columns 1 through 4 indicate that misalignment status does not have much effect on labor supply between the ages of 23 and 49 but we observe statistical differences in wages, suggesting that misalignment in youth is likely to be associated with occupation quality. Column 5 investigates whether an individual is over-qualified for a current occupation in terms of education completed. Estimates indicate that over-aligned and high-aligned youth are 10 and 11 percentage points more likely to be over-qualified for their job.¹¹ Column 6 shows that both groups are likely to have a more prestigious occupation. Estimated coefficients are statistically significant and practically large as well (the sample mean is 37), suggesting that those groups sorted into better jobs over their careers. Even though over- and high-aligned individuals tend to be over-qualified for their jobs, there appear to be other payoffs such as higher wages and more occupational prestige.

Subgroup analysis

Given the substantial labor market benefits of having over-aligned educational expectations and occupational aspirations compared to under-aligned, it is important to understand whether the estimated effects of alignment vary across subgroups. In Table 5, we report the estimated relationship of alignment on labor market outcomes, estimated separately by gender and race/ethnicity. The first column reports estimates for the full analytic sample and

Table 5. Heterogeneous effects of alignment on labor market outcomes.

	Full Sample	Male	Female	White	Black	Hispanic
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A: Log Wages</i>						
Over-aligned	0.101*** (0.017)	0.130*** (0.025)	0.082*** (0.025)	0.111*** (0.025)	0.069* (0.030)	0.129** (0.041)
High-aligned	0.072*** (0.017)	0.070** (0.022)	0.080** (0.026)	0.076** (0.023)	0.066* (0.029)	0.041 (0.042)
Low-aligned	-0.020 (0.017)	-0.004 (0.024)	-0.029 (0.024)	-0.013 (0.024)	-0.017 (0.029)	-0.039 (0.038)
<i>Panel B: Number of Weeks Worked</i>						
Over-aligned	0.620 ⁺ (0.364)	0.090 (0.442)	1.523* (0.591)	-0.133 (0.458)	2.285** (0.790)	0.880 (0.857)
High-aligned	0.136 (0.339)	-0.372 (0.405)	1.136 ⁺ (0.584)	-0.104 (0.403)	0.873 (0.746)	-0.442 (0.891)
Low-aligned	-0.032 (0.432)	-0.067 (0.560)	0.669 (0.669)	0.416 (0.515)	-0.236 (0.921)	-0.365 (1.075)
<i>Panel C: Employed</i>						
Over-aligned	0.024*** (0.006)	0.025*** (0.007)	0.026** (0.009)	0.014* (0.007)	0.042*** (0.012)	0.034* (0.014)
High-aligned	0.015** (0.005)	0.005 (0.006)	0.028** (0.009)	0.003 (0.006)	0.023* (0.011)	0.039** (0.014)
Low-aligned	0.011* (0.005)	0.011 (0.007)	0.015 ⁺ (0.009)	0.018** (0.007)	0.005 (0.011)	0.008 (0.013)
<i>Panel D: Over-qualified</i>						
Over-aligned	0.096*** (0.018)	0.118*** (0.027)	0.069** (0.023)	0.106*** (0.025)	0.034 (0.030)	0.124** (0.043)
High-aligned	0.114*** (0.017)	0.137*** (0.023)	0.084*** (0.023)	0.119*** (0.023)	0.098*** (0.029)	0.078 ⁺ (0.042)
Low-aligned	0.051** (0.018)	0.039 (0.028)	0.051* (0.023)	0.059* (0.024)	0.031 (0.032)	0.037 (0.048)
<i>Panel E: Occupation Prestige</i>						
Over-aligned	3.433*** (0.426)	4.062*** (0.630)	2.736*** (0.607)	3.505*** (0.595)	2.883*** (0.803)	4.040*** (0.930)
High-aligned	2.906*** (0.415)	3.244*** (0.562)	2.443*** (0.628)	3.129*** (0.569)	2.604*** (0.739)	2.737** (1.012)
Low-aligned	-0.461 (0.397)	0.235 (0.519)	-1.172 ⁺ (0.629)	-0.104 (0.552)	-0.080 (0.728)	-1.530 (0.946)

Estimated effects in each panel are from a separate regression with different dependent variables.

Observations are restricted to individuals who are not enrolled in schooling. Each regression also includes additional controls specified in Equation (2). Robust standard errors are in parentheses.

⁺ $p < 0.10$. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

each subsequent column presents estimates of a specific subgroup. Each panel presents results for a different dependent variable.

The effects of alignment on log earnings (Panel A) look very different by race/ethnicity. Over-aligned Hispanic students are predicted to earn 13% more than under-aligned Hispanic students, whereas the predicted wages for over-aligned black students are 7% higher than under-aligned black students.¹² Over-aligned white students are predicted to earn 11% more than under-aligned white individuals. In addition, high-aligned females and white students show 8% higher wages than their under-aligned counterparts. Thus, being over- or high-aligned is positively associated with earnings for

a majority of subgroups. Further, having low-aligned educational expectations and occupational aspirations does not result in any subgroup differences in wages compared to the under-aligned group.

In terms of number of weeks worked (Panel B), over-aligned Black and female individuals work roughly 2 weeks more per year than the under-aligned counterparts. Most of the subgroups experience increases in the predicted probability of being employed compared to under-aligned counterparts, although the magnitude for most subgroups is between only 1% and 5% (Panel C).

Across all subgroups, over-aligned and high-aligned students are over-qualified for their jobs (Panel D) and have higher prestige occupations (Panel E). Females tend to realize substantially smaller differences than males (7% vs 12% and 8% vs 14% for over- and high-aligned) in over-qualification and occupational prestige. Hispanic students see large advantages to being over-aligned, nearly 12%, in terms of over-qualification compared to whites. However, this may be indicative of less opportunity for jobs that match their education level compared to whites. With respect to occupational prestige, relative to under-aligned, all gender and racial subgroups show high-aligned individuals are better off.

Overall, results indicate that over-aligned students in specific subgroups perform significantly better than those in other groups. For example, the estimated benefit of being over-aligned compared to under-aligned on wages (13%) and on the probability of being over-qualified (12%) is the greatest among Hispanic students. The estimated effects for over-aligned Blacks are 7% for wages and not statistically significant for being over-qualified. Since the estimated benefits are larger for students from certain subgroups, interventions can be targeted toward those groups who will benefit the most from increased alignment of educational expectations and occupational aspirations.

Discussion

We sought to investigate the relationship between having aligned or misaligned educational expectations and occupational aspirations as an adolescent on future labor market outcomes. Although previous studies (Sabates et al., 2011; Schmitt-Wilson & Faas, 2016) have shown that alignment of educational expectations and occupational aspirations was a factor in wage, attainment, and employment outcomes, they were based on snapshots early in one's career, which may not account for life-cycle biases in the representation of lifetime outcomes (Haider & Solon, 2006). To account for the biases, we estimated the effects of alignment in survey participants' forties and presented lasting effects of alignment in high school.

We found meaningful differences in long-term labor market outcomes for high- and over-aligned participants after controlling for family resources. Over-aligned students were more likely to have higher wages, be employed,

and in more prestigious careers. High-aligned students also ended up in more prestigious careers. Having high educational expectations, whether aligned or not, appeared to be beneficial in the labor market, with the returns being most apparent in ones 30s and into ones 40s. Our findings that the effects of aligned and misaligned educational expectations and occupational aspirations change depending on the age of the individual show that having high expectations and aspirations is even more important for labor market outcomes than previously estimated.

There appeared to be labor market benefits to pursuing more education, whether one needed it for their desired career or not, which is in line with previous research on the returns to education (e.g. Bureau of Labor Statistics, 2017; Daly & Bengali, 2014). Additional education is also related to a variety of non-labor market outcomes such as civic participation and health (Conti et al., 2010; Dee, 2004), which extend beyond additional education's career benefits. Moreover, there do not appear to be negative mental health consequences of aiming high and not achieving one's goals (e.g. Reynolds & Baird, 2010). The commonality between over-aligned and high-aligned is that they both contain students with high educational expectations. To break down the effect more finely, we restricted the sample to those who have high educational expectation. Results show that the effects on log wages were larger for over-aligned (6.4%, standard error of 0.032) than for high-aligned (0.9%, 0.031), which indicates that, once we account for occupational aspirations, these two groups exhibit different labor market trajectories. Therefore, we argue that the effects are driven by the alignment of educational expectations and occupational aspirations rather than the educational expectations alone.

Our estimates are from a cohort of high school students from the late seventies, and many factors that may affect students' college and career plans have changed since then. Comparing our results to those from Schneider et al. (2017), who examined the relationship between alignment of educational expectations and occupational aspirations and college enrollment using a cohort of high school students from High School Longitudinal Study of 2009 (HSLS:09), we find some differences. Notably, compared to the cohort from the 1970s, females in the late 2000s are more likely to attend college and their career aspirations appear to have risen as well. Black students are now less likely to be under-aligned compared to white students and are attending college at similar rates. Enrollment numbers for Hispanics are similar to whites and blacks; however, they are more likely to be misaligned, suggesting that they are especially disadvantaged with respect to education and occupational information.

In the past two decades, real wages declined for less educated workers without a four-year college degree and the share of employment accounted for by these workers dropped (Acemoglu & Autor, 2012; Goldin & Katz, 2009). The advance in technology, which is expected to increase productivity

of high-skill workers, may further widen inequality among skill groups unless workers are more educated (Acemoglu & Autor, 2012; Becker, 2009; Goldin & Katz, 2009; Tinbergen, 1974; Welch, 1973). As the education requirements of the workplace have risen and the assignment of education to jobs is evolving over time, students are required to have an understanding of the types of jobs they want and the education required for those jobs so that they are in a position to acquire whatever skills are necessary for the work they eventually do.

In order to address gaps in educational attainment and eventual labor market success, schools should focus on educating students about how education fits into their expected career trajectory. Although college may not be for all students, having information about careers and education, and the interplay between the two, is important for individuals to transition into adulthood without floundering. As expectations and aspirations have risen, this has become especially true for disadvantaged students who do not often have access to school counselors and whose parents often did not attend college themselves (Perna, 2004; Perna et al., 2008). For example, options about how to fund one's education need to be made explicit to students who otherwise cannot access such information through family or social networks (e.g. Hoxby & Turner, 2013). This extends beyond postsecondary options to also include high school course-work, where they can get academic help when they need it, and strategies for academic success.

Another potential point of intervention could be through psychological, social, and emotional programs that stress the importance of persistence through setbacks and maintaining a vision for the future despite changes in expectations and aspirations. The ability to develop aspirations and to stick with them even when coping with failure is an important skill for high school students to learn as they embark on postsecondary education. Growth mindset interventions, for example, could help individuals aim for higher levels of education by realigning motivation and providing needed assistance in finding one's place as they move into adulthood and a career. Gaining a better understanding of how one's education and career fit in with sense of self might help students achieve their goals. Alignment has more to do with motivation and identity than with qualities and competitiveness of an institution. Interventions designed to help students find their fit in the world of education and work can go a long way toward easing the transition to adulthood.

This article presents evidence that high school students who have over- and high-aligned educational expectations and occupational aspirations are predicted to have higher wages and more prestigious career paths compared to under-aligned peers. The estimation involves, by construction, selection bias due to the fact that labor market outcomes are observed only for the people who work. In addition, to identify the causal effect of aligned educational expectations and occupational aspirations on labor market activities, one must

recognize that expectations and aspirations are not only endogenous but also are potentially biased (Dee, 2005; Gershenson, Holt, & Papageorge, 2016). These results are not causal, and leave many open questions. For example, although women tend to see advantages to being over-aligned, do these benefits extend to occupations that are traditionally male-dominated? It is clear, though, that the choices students make in high school matter for later outcomes, but they need the information and resources to advance their educational expectations and occupational aspirations as they consider their future career trajectories.

Notes

1. Haider and Solon (2006) showed that earnings from an individual's mid-career were a better indicator, although not perfect, for lifetime earnings than earnings from an individual's early-career.
2. Alignment is distinct from the idea of "match" in the higher education literature. Match is concerned with whether a student's educational institution is appropriate for their academic achievement (Dillon & Smith, 2017; Kidder & Lempert, 2014), whereas alignment is concerned only with expectations and aspirations and not with what education a student actually pursues.
3. The Dictionary of Occupational Titles (DOT) provides occupational information from the 1930s to 1990s, but Deming (2017) used NLSY79 and NLSY97 to show that the two sources, DOT and O*Net, yield similar results for analogous task measures. As O*Net provides more recent data, we opted to use O*Net.
4. We included oversamples of African-American and Hispanic individuals. The oversamples of economically disadvantaged whites and the military individuals were not included because they were not interviewed after 1985 and thus their labor market outcomes in their thirties and forties are not observed.
5. We compared the sample characteristics of the full sample to the analytic sample and found no statistical differences between the two.
6. We dropped individuals who do not have either educational or occupational expectation measures in the estimation. We have conducted sensitivity analyses and results indicate that estimates are robust to the inclusion of these individuals.
7. X includes race dummies with white as the reference group, gender, race-by-gender indicators, age and age squared, father's education, mother's education, real log family income, number of siblings, urbanicity indicators in 1979, normalized AFQT scores, and the normalized combination of Rotter and Rosenberg scores.
8. If we include schooling variables, we cannot distinguish whether misalignment causes higher wages or whether misalignment causes additional years of schooling and thus higher wages. Least squares estimates including schooling variables are likely to overestimate the coefficients on schooling and underestimate the contribution of misalignment to wages (Carneiro, Heckman, & Masterov, 2005; Heckman, Lochner, et al., 2006). Thus, excluding schooling from the wage equation produces larger estimated effects on the misalignment measures, which estimate the net effect of misalignment on wages, capturing both of the direct effects and indirect effects through schooling.
9. In Table A1, we show that both of cognitive and non-cognitive skills are positively associated with over-alignment and high-alignment and are negatively correlated with under-alignment and low-alignment. The correlation between high-alignment and cognitive skills is 0.25, and between high-alignment and non-cognitive skills it is

- 0.13. If misalignment measures proxy for unmeasured cognitive or non-cognitive skills, the estimates on misalignment are likely to be underestimated.
10. Further analysis shows that the probability of being unemployed is 1 percentage point lower for over-aligned than under-aligned and has higher economic significance, considering the sample mean is 7.8%. There is no difference in the probability of being out-of-labor-force across misalignment groups.
 11. We excluded observations prior to 1988, as over-aligned individuals are likely to obtain degrees in graduate school or professional programs. Results are robust to including years prior to 1988.
 12. [Table A1](#) summarizes the estimation results on determinants of misalignment. Estimates indicate that participants whose parents have bachelor's or advanced degrees are 6.3 percentage points less likely to be misaligned. Estimates also show those with higher levels of cognitive or non-cognitive skills are more likely to be either over-aligned or high-aligned and less likely to be under-aligned. On average, females are 5.4 percentage points more likely to be over-aligned and 9.7 percentage points less likely to be under-aligned. Black individuals are more likely to be high-aligned and Hispanic individuals are more likely to be over-aligned.

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Appendix

Table A1. Determinants of alignment.

	Misalign	Over-align	Under-align	High-align	Low-align
	(1)	(2)	(3)	(4)	(5)
Female	−0.043 ⁺ (0.023)	0.054** (0.018)	−0.097*** (0.021)	−0.013 (0.019)	0.071*** (0.017)
Black	−0.011 (0.030)	0.086*** (0.025)	−0.094*** (0.026)	0.160*** (0.026)	−0.128*** (0.022)
Hispanic	0.050 (0.033)	0.072** (0.027)	−0.030 (0.028)	0.078** (0.029)	−0.123*** (0.025)
Black Female	−0.030 (0.038)	0.027 (0.032)	−0.057 (0.036)	−0.028 (0.033)	0.037 (0.027)
Hispanic Female	−0.046 (0.045)	0.021 (0.037)	−0.053 (0.041)	−0.014 (0.041)	0.050 (0.032)
Parental Ed	−0.046 ⁺ (0.027)	0.063** (0.020)	−0.161*** (0.029)	0.068** (0.022)	−0.121*** (0.030)
Family Income	−0.005 (0.015)	0.025* (0.012)	−0.031* (0.014)	0.018 (0.013)	−0.006 (0.011)
Cognitive Skills	0.001 (0.011)	0.064*** (0.010)	−0.054*** (0.010)	0.100*** (0.010)	−0.090*** (0.008)
Noncognitive Skills	0.004 (0.010)	0.036*** (0.008)	−0.035*** (0.009)	0.022** (0.008)	−0.029*** (0.007)
	3,585	3,585	3,585	3,585	3,585

Dependent variable is a measure of whether the individual is misaligned in column 1, over-aligned in column 2, under-aligned in column 3, high-aligned in column 4, and low-aligned in column 5 in the unweighted sample. Each model is estimated by logit regression and marginal effects are reported. Non-Hispanic whites are the omitted race category, so all of the race coefficients are gaps relative to whites. Robust standard errors are in parentheses. The regression also controls for number of siblings, age and urbanicity fixed effects.

⁺ $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.