# Preparing for an Uncertain Economy: How Occupational Expectations, Educational Attainment, and Labor Market Fluctuations Predict Death by Suicide and Substance Abuse by Midlife

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Abstract:

The increase in rates of mortality by suicide and substance abuse for middle age adults in recent cohorts has sparked research on the social, economic, and cultural forces that shape these "deaths of despair." Building on recent advances in sociological theories of suicide, we investigate whether macro-level changes in the labor market structure contribute to suicide and substance abuse mortality. Specifically, we examine how adolescent occupational expectations are associated with death by suicide and substance abuse in a cohort of individuals that experienced changes in the occupational opportunities in the labor market as adults. Using the High School and Beyond dataset linked to mortality records gathered at midlife, we find that adolescent men who expected occupations that declined in labor market share during early adulthood are at increased risk of death by suicide or substance abuse in adulthood. These results hold even when considering, educational attainment, family background and early mental health. Our findings have important implications for understanding how education and labor market uncertainty specifically, and social forces more generally, shape deaths of despair.

The only causes of death for which mortality rates have increased in recent years involve so called "Deaths of Despair": suicide, drug poisoning, and alcohol-related liver diseases (Case and Deaton 2015). Since the publication of these mortality trends, many have puzzled through the social, economic, and cultural explanations for the increase in mortality risks associated with these causes of death (Schmid 2016; Snyder 2016; Gelman and Auerbach 2016; Case and Deaton 2017). Some researchers have argued that changes in the labor market structure in the 21st century, especially in relation to the decrease in blue-collar jobs, may play a role in these mortality rates, but to date analyses predominantly rely on aggregate rates of mortality to examine these questions (Case and Deaton 2017). There is good reason to suspect links between the economy and individual suicide. Since Durkheim's classic work *Suicide*, research has repeatedly suggested that changes to the economy that result in individual changes in social status can augment vulnerability to suicide (Durkheim [1897] 1951; Gunnell and Chang 2016); however, little research has been able to estimate how individuals' life aspirations can be hindered by macro-level economic factors and contribute to risk of death by suicide and substance abuse.

We present such an analysis. To do this, we use the High School & Beyond dataset (HS&B), a nationally representative sample of sophomores and seniors in high school in the U.S. in 1980, matched to mortality records collected during midlife. The cohort represented in the HS&B data offers a unique opportunity to investigate how the labor market transformation links adolescent expectations to adult realities. During adolescence, as these individuals were developing expectations of where they would fit in the labor force as adults, employment in blue-collar occupations that did not require a college degree provided many of their parents and members of their communities with steady employment and middle-class lifestyles. However,

after many manufacturing jobs were shipped overseas and computers became more commonplace in the late 1980s, employment opportunities in these occupations decreased (Autor, Levy and Murnane 2003). Building on the rich history of sociological research on how social forces can shape suicide (Durkheim [1897] 1951; Mueller and Abrutyn 2016; Abrutyn and Mueller 2018), we investigate whether expectations for one's life serve as a link between broader social circumstances and individual vulnerability to suicide and substance abuse death. Specifically, we leverage the unique case of adolescents' occupational expectations combined with changes in occupational opportunities in the labor market and examine the potential consequences for suicide and substance abuse mortality risks later in life.

In addition, we examine differences in mortality patterns for those who died by suicide and those who died by substance abuse. Indeed, even though Durkheim emphasized the case of suicide, his theory was meant to inform how society shapes deeply personal and seemingly psychological factors; in other words, any deaths of despair. This approach is also important because sorting suicide deaths from substance abuse deaths is quite controversial as intentionality is often hard to assess after a death (Rockett et al. 2015). Research has documented how subjective the process of recording deaths can be (Rockett et al. 2015; Rockett et al. 2014; Timmermans 2005; 2006). We hypothesize that occupational expectations linked to changes in the labor market structure may have affected suicide deaths broadly defined, including those whose deaths were coded as suicide or substance abuse, but we also investigate possible demographic, economic and educational disparities in these causes of death.

Below, we discuss existing research on deaths of despair and sociological insights into how social forces shape suicide risks, before reviewing what is known about the social psychological factors associated with adolescent occupational expectations and how they shape

life course trajectories. Then, we present our theoretical model linking macro-level changes in the labor market structure to social psychological factors related to individuals' expectations and risks of death by suicide and substance abuse. We hypothesize that adolescents who expect to enter sectors of the labor market in which the employment share declined are at increased risk of death by suicide or substance abuse later in life. Given the gendered nature of employment in the blue-collar jobs that decreased in labor market share during our time period of interest (Black and Powell 2017; Autor et al. 2003 Sutton et al. 2016) and differences in mortality patterns by gender that limit the sample size of women available and our statistical power, we focus our analysis on men. We account for early life determinants of early mortality risk related to family background, mental health, academic achievement, and educational and occupational attainment in these pathways. This work has the potential to provide insights on how the link between changes in the labor market structure, expectations, and risks of death by suicide or substance abuse operates and on preparing students for the uncertainty of labor markets in adulthood.

**Mortality Trends and the "Deaths of Despair"**

Advances in medicine have supported decreasing mortality rates for all individuals for several decades. As Case and Deaton (2015) note, an increase of about half a percent per year in mortality rates for non-Hispanic white Americans in midlife (ages 45 to 54) starting in 1998 is an exception to this trend, while other groups continue to experience declines in mortality. This change in mortality trends, they argue, was largely driven by an increase in deaths recorded as suicides, drug poisonings, and chronic liver disease, especially among those without any college education (2015). In fact, mortality rates for suicide and drug poisonings increased for all education and racial/ethnic groups between ages 30 and 64 from 1999 to 2013, and have continued to increase (Case and Deaton 2017; Miech et al. 2011). These "deaths of despair"

suggest that pathways to suicide and substance abuse death operate through economic and social factors that contribute to depression, anxiety and substance use (Case and Deaton 2017).

One of their overarching theories is that changes in the labor market opportunity structure during this time period made it challenging for individuals without a college education to obtain meaningful, gainful employment, potentially leading to feelings of helplessness that may feed into substance abuse or suicide. However, research at the aggregate level is mixed in this regard. For example, while one study found that deaths of despair are concentrated in areas with high economic distress (Monnat 2018), another focusing on areas most vulnerable to changes in blue collar employment opportunities found the opposite; suicide and substance abuse mortality was lower in the more economically vulnerable areas (Bound et al. 2018). Changes in the labor market may have contributed to increases in deaths of despair, but individual-level analyses and longitudinal data are necessary to understand how these changes impact deeply personal feelings of despair and suicide and substance abuse mortality.

One caution for understanding the role of the labor market in "deaths of despair" is a careful consideration of the context of these deaths. Recent research has questioned Case and Deaton's conclusions that treat suicide and substance abuse mortality similarly (Masters et al. 2017). The patterns that lead to substance abuse mortality, including access to and a reliance on medication as a cure for mental and physical pain (Dasgupta et al. 2018), may differ from the life course patterns that may lead to suicide. In addition, postmortem assignment of cause of death by coroners and medical examiners may be shaped by social forces and not just forensic analysis (Rockett et al. 2015; Rockett et al. 2014; Timmermans 2005; Timmermans 2006). For example, Rockett et al. (2015) found that the labeling of drug poisonings as "accidental" versus "intentional" varies across states and the structure of the medical institutions. Both of these

findings suggest caution before aggregating causes of death. In this study, we draw on sociological insights into how social forces can shape suicide, defined broadly as deaths coded as suicide and substance abuse, and empirically examine these causes of death separately to understand the social psychological factors that make individuals vulnerable to changes in society.

**Social Forces and Suicide**

Sociology has a long history of examining how suicide, a seemingly personal and individualistic act, is shaped by large societal forces. In his classic work, Durkheim suggests that one's suicide risk is determined by integration into a community and the regulation of behavior within this context. Too much or too little of either, he argues, can contribute to suicide. This concept of suicide connects individuals' characteristics to their place within broader society, which can be challenging to investigate empirically. Much of the research in this area examines how suicide rates at the county or state level are related to aggregate indicators of religious involvement (Pescosolido and Georgianna 1989; Ellison et al. 1997), inequality (Wadsworth and Kubrin 2007), and labor market opportunities (Wray et al. 2011). Individual-level data for those who have died is often limited and, in the rare circumstances that researchers capture an individuals' characteristics before their death, it is even rarer to have an adequate sample size for empirical analysis (Wray et al. 2011).

Studies with data that have made it possible to connect individual characteristics to suicide have found that the aspirations, feelings, and identities of individuals are an important part of understanding how social forces contribute to suicide (Wray et al. 2011). For example, Mueller and Abrutyn (2016) argue that individuals form expectations about their lives through interactions with their community, and the shared cultural ideas about their current and future

roles regulate their expected life pathways. However, if these expectations are unmet, particularly in contexts of excess structural integration and cultural regulation, perceived failures can harm mental health and exacerbate risk of suicide (Mueller and Abrutyn 2016). In their illustrative case, the authors investigate suicide risk within a highly integrated community with a culture of high expectations for academic success. Students who internalize expectations for success are at an increased risk of suicide if they experience academic failure (Abrutyn, Mueller, and Osborne 2019). Their contribution to Durkheim's theory is social-psychologically linking individual aspirations and fears of failure to community integration and cultural regulation. We build on this research to develop a theory on how macro-level changes to occupational opportunities can increase risk of suicide for individuals whose occupational expectations culturally integrated them into occupations with declining opportunities.

*Occupational Expectations and Labor Market Uncertainty*

Jobs define more than just where employees get their salaries and benefits from; they shape who people interact with, where they choose to live, and how they define their identities. The generic question "What do you do?" can encapsulate many dimensions of life, but most often refers to "What do you do for work?". Those within the same occupation take on certain cultural scripts to form a collective identity surrounding their place within the economy. In his classic work, Durkheim viewed the occupational group as "the richest sort of material for a common life" that provides opportunities for protecting individuals from suicide because "it is omnipresent, ubiquitous, and…its control extends to the greatest part of life" ([1897] 1951, pg. 346). The collective culture within occupations is often how individuals choose what occupations they aspire to enter (Becker 1993). When trying to determine what career fits best, whether internally or through counselors or career tests, individuals match their skills,

experiences, and personalities with those of individuals employed within different occupational categories (Savickas et al 2009). The culture of an occupation can be linked to stereotypes associated with those most often employed in that occupation, such as with gendered occupations (Ridgeway 2011). For example, research has noted the "shop-floor" culture among working-class men and those in blue-collar occupations, tied to masculinity, physical power, and lack of intellectuality (Collinson 2010). In *Learning to Labor*, Willis (1981) describes how this culture starts in the home, builds within school, and then thrives within the young men who identify with these occupations. In defining their occupational expectations, adolescents match the culture of what they see in their homes, in their schools, and in their communities with what they want their lives to look like (Fouad 2017).

Of course, adolescents imagine their future occupations with little information about how the labor market may change as they enter and progress through adulthood (Orrange 2007; Beck 1992). Instead, they rely on limited information often based on the expectations of their community, parents, schools, and peers to anticipate how their careers may unfold (Fouad 2017). Our identities continue to shift across the life course as we receive external and internal signals about where we belong and what we can do, but adolescent occupational expectations can have a lasting effect. For example, research has found that adolescent occupational expectations are related to wages (Staff et al. 2010), educational attainment (Morgan et al. 2012), and mental health (Brim 1976; Drebing et al. 1991; Carr 1997) later in life.

Adolescents form their occupational expectations through their perceptions of the labor market and what types of occupations will support the life they anticipate having as an adult (Becker 1993). Thus, occupational expectations contribute both to what an individual will *be*, as in what occupation they identify with, and what they will *do*, as in what their activities inside and

outside of work will look like. Gender identity and gendered conceptions of occupations are often a part of this process, reproducing gender inequality in the workforce (Ridgeway 2011). Occupational expectations are developed during school and link to students' cultures within the classroom (Morris 2012; Willis 1981). For example, students who expect professional occupations focus on achieving in school and listening to teachers because they view their intellect as their way up the occupational ladder. Students who expect to be manual laborers develop a culture of masculinity, physical strength and disobeying teachers, for achievement in school appears less tied to their future success (Willis 1981). Given that occupations are so closely tied to identities, drive who people interact with and what they do on a daily basis, and determine the financial and cognitive resources they have, occupational expectations can act as a signal of the cultural context adolescents expect to reside in as adults.

Integration into this culture as an adolescent, however, may limit future possibilities if the labor market changes. Adolescents who expected an occupation that declined in labor market share after high school may not have achieved that expectation or the life they expected to have as an adult. Research has found that failure to meet occupational expectations can have negative effects on adult mental health (Brim 1976; Levinson 1978; Drebing et al. 1991; Carr 1997). However, these studies have not considered the role of structural changes to the labor market. There are many ways individuals may have reacted to their occupational dreams disappearing—from instrumental life changes, such as returning to school for more training or migrating to parts of the country with better job opportunities, to emotional reactions, such as depression, substance abuse, and suicide (Goldman et al. 2018; Schneider and Harknett 2019; Burgard and Seelye 2016).

*Labor Market Changes and Mortality Risks*

There is a substantial literature that supports the idea that broad labor market fluctuations can contribute to increases in suicide rates and deaths by substance abuse (Haw et al. 2014; Platt 2016; Kim et al. 2015). For example, male suicide rates increased after an economic downturn in Portugal and during times of economic crisis in Asian countries (Pereira dos Santos et al. 2016; Chang et al. 2009). In fact, the World Health Organization warned of a potential increase in suicides after the recession in 2008 (WHO 2009), which did indeed occur among men in European and American countries (Chang et al. 2013). This research often links recessions to increased suicide rates through changes in unemployment and financial resources, but does not examine individual-level factors, especially related to expectations (Gunnell and Chang 2016).

At the individual-level, the labor market status—including precarious employment, monotonous work, early retirement, and long periods of unemployment—is associated with increased risks of suicide (Min et al. 2015; Schneider et al. 2011; Schneider and Harknett 2019). Generalized economic insecurity, including poverty, foreclosure, and job loss, is also associated with increased risk of death by suicide and alcohol or drug related poisoning (Kerr et al. 2017). At the occupation-level, suicide rates for individuals within different occupations vary according to occupational class, but not in consistent ways (Kreitman et al. 1991; Roberts, Jaremin, and Lloyd 2013; Platt 2016). Rather, the risk of suicide among those who hold particular occupations depends on the time period of study. For example, Roberts, Jaremin, and Lloyd (2013) found that none of the occupations that ranked highest in suicide rates in 1981 were similarly high in 2001. In fact, the occupations with significant increases in suicide between these two time points were mainly manual occupations, especially coal miners, laborers, and window cleaners (Roberts, Jaremin, and Lloyd 2013). Available data has limited the ability to assess the role of occupational expectations in individuals' reactions to economic fluctuations.

*Educational and Occupational Attainment and Mortality Risks*

In addition to changes in economic structures that make it harder to translate expected futures into realities, there is also important variation in individuals' abilities to respond to labor market changes. Individuals who go to college are more likely to possess flexible skills and credentials that facilitate their adaptation to changes in the labor market structure. Flexible skills, like analytic and communication skills, better prepare students for fluctuations in labor market demands and occupational opportunities in the future than specific vocational training. In this college-for-all era, a college degree is increasingly viewed of as essential to obtain jobs that support a middle-class lifestyle in the 21st century economy. However, before the shift in labor market structure, less than half of high school students expected to go to college (Goyette 2008). In fact, educational expectations were more aligned to occupational expectations; students who expected subbaccalaureate occupations rarely expected to obtain a bachelor's degree (Goyette 2008; Schneider and Stevenson 1999). Although the relationship between educational and occupational expectations is more complicated in recent cohorts (Goyette 2008), those who expected subbaccalaureate occupations in the 1980s largely also did not plan to or actually attend college (Collins 2002). In addition, research has found that unmet educational expectations only predict negative mental health outcomes through lower levels of educational attainment (Reynolds and Baird 2010). Thus, part of one's occupational expectations is whether one expects to have to receive any education after high school. In general, individuals who hold a baccalaureate degree with a college degree have lower risks of mortality and have better mental health outcomes. They may have flexible skills that aid in improving health knowledge and behavior, as well as better opportunities to secure high status jobs and better financial security (Montez and Zajacova 2013; Masters et al. 2015; Reynolds and Baird 2010). With this study, we

estimate the effects of occupational expectations and educational expectations independently, given their strong connection, but the focus of our paper is on occupational expectations and educational attainment.

Previous research has found that the increase in deaths by suicide and substance abuse is concentrated among those without a baccalaureate degree, but disparities in educational attainment cannot account for the increased rates of these causes of death (Case and Deaton 2015; Case and Deaton 2017). Country-level analyses of educational attainment and suicide rates find that suicide is higher in countries with both the lowest and the highest levels of educational attainment (Shah and Bhandarkar 2009), with some evidence suggesting that low educational attainment is a risk factor for suicide among men but protective against suicide for women (Lorant et al. 2005). For death by substance abuse in particular, mortality gaps by educational attainment increased the most among those who died by accidental poisoning between 1999 and 2007, despite increases in accidental poisonings for all groups (Miech et al. 2011). Considering early life factors that contribute to decisions to go to college may be important to gain a better picture of what shapes the educational gradient in risks of mortality by suicide or substance abuse. We examine the role of educational attainment in predicting death by suicide or substance abuse and in the link between occupational expectations and mortality.

In addition, some individuals may have achieved their occupational expectations early in the life course, which could contribute to their risks of death by substance abuse or suicide in a few different ways. In one perspective, those who were employed in their expected occupations in early adulthood may have been protected by the changes in the labor market structure and remained in their occupation of choice, lowering their vulnerability to suicide. However, obtaining the occupation one expects may validate their connection to this occupation, tying their

identity to their specific job. If their opportunities within this occupation later declined, they could be at an even greater risk of suicide later in life. Or, an alternate perspective is that those who did not achieve their occupational expectations in early adulthood, before larger social forces limited their opportunities, may feel depressed or rejected, which in turn could lead to greater risk of suicide (Brim 1976; Levinson 1978). The link between expectations and attainment in the education literature discussed above suggests that educational attainment better predicts suicide than educational expectations, which could also be true for occupational expectations and attainment. Although we do not have adequate statistical power to estimate the interactions between expectations and attainment that this literature suggests, we condition on attainment in early adulthood to understand its role in the link between occupational expectations and death by suicide or substance abuse later in life.

**A Durkheimian Framework of Expectations, Labor Market Change, and Suicide**

To formalize our theoretical ideas we argue that adolescent occupational identity conditions how individuals experience economic instability in ways that are meaningful for understanding suicide risk. Our contribution is to link the social psychological elements of occupational identity formation to macro-level changes to the labor market and suicide risks. Specifically, we posit that identity formation in adolescence connected to occupations increases vulnerability to suicide for individuals who had limited opportunities to achieve their expected occupations later in life. Shifts in the labor market can make some occupations worth more and others worth less, decreasing both the job opportunities within an occupation and the financial rewards for employees. The types of occupations that support middle-class lifestyles when adolescents are forming their occupational expectations may not support the same type of lifestyle later in life. Such macro-level changes in the structure of the labor market are examples

of social forces that can contribute to suicide among individuals whose identities and expectations are tied to occupations affected by the labor market changes.

Leveraging a unique dataset with adolescent occupational expectations measured before a change in the labor market structure, we examine whether expecting an occupation is a risk factor for death by suicide or substance abuse if the occupational demands of the labor market limit job opportunities. For our cohort, the occupations that declined were concentrated among heavily male-dominated blue-collar occupations, including laborers, craftsman, farmers, machine operators, and occupations within the military, as shown in Appendix A. We focus on mortality in adulthood, from around age 26 to around age 50, to include any deaths by suicide or substance abuse that occurred after the shift in occupational demands in the labor market between 1980 and 1990. This wide window of time not only provides us with a sufficient sample size of mortality by different causes, but it also gives sample members time to experience and react to the structural changes in the labor market. As Durkheim notes, "repeated experiences are needed to reveal the complete emptiness of an egotistic life or the total vanity of limitless ambition" ([1897] 1951, pg. 289). In addition, our longitudinal dataset allows us to connect causes of death to early life social, academic, and economic factors.

Below are our hypotheses:

*Hypothesis 1: Adolescents who expected occupations that declined in labor market share after high school will be at higher risk of death by suicide or substance abuse in adulthood than those who expected occupations that increased in labor market share or remained static.*

*Hypothesis 2a: Young adults who hold a baccalaureate degree will be protected against mortality by suicide or substance abuse in adulthood.*

*Hypothesis 2b: Educational and occupational attainment in early adulthood will mediate the association between occupational expectations and mortality by suicide or substance abuse in adulthood.*

## Data

HS&B started as a survey of 60,000 sophomores and seniors nested within high schools in 1980. A panel sample of respondents were followed up in 1982 and a nationally representative panel was selected for the 1984, 1986, and 1992 (sophomore only) surveys. These data are supplemented with high school and postsecondary transcripts, as well as parent and teacher surveys. Our analysis focuses on men, who were more likely to expect the blue-collar jobs that declined in labor market share and die by suicide, than women, whose labor market plans often excluded these heavily male-dominated professions and have lower risks of early mortality. We exclude sample members who died before early adulthood because the changes in the labor market structure we examine largely occurred before 1990, when most sample members were between ages 26 and 28, and two of our key independent variables, educational and occupational attainment, are measured during early adulthood. Thus, our analytic sample includes all male panel members with valid measures of occupational expectations who survived to the age of 25. Our final analytic sample is 11,890.[1]

## Measures

*Mortality:* HS&B sample members' mortality status and cause of death was ascertained by matching records to mortality databases (National Death Index and the Social Security Death Index), as well as supplementary information from internet searches, genealogical websites, credit bureau databases, and online obituaries (See Warren et al. 2017 for more details). Most sample members were around the age of 50 at the time of this data collection (2013 to 2015).

Our outcome is a categorical variable indicating whether the respondent had died by suicide, died by substance abuse, died from some other cause, or was designated as living (those not found in any of our mortality searches). We categorized these deaths from ICD-9 and 10 codes, following Masters et al. (2017), Rockett et al. (2015), Case and Deaton (2015), Miech et al. (2011), and Warren et al. (2018).[2] Approximately 60 men died by suicide and 60 men died by substance abuse between age 25 and when the mortality data were collected. Although we combine deaths related to drugs and alcohol within death by substance abuse, this category is largely composed of people who died by accidental drug poisoning.

*Occupational Expectations:* In their senior year of high school, the students were asked to name the job or occupation they expect or plan to have at age 30. Students were given a list of 17 broad occupational categories (e.g. laborer, professional, homemaker, or service) from which to choose. We collapsed the 17 HS&B occupational categories into four larger categories using the change in labor market share of each category based on job information from the 1980 and 1990 (5%) census years and whether the occupation generally requires a college degree. Appendix A displays which occupational categories from the survey fit into each category of our constructed variable.[3] The four categories are predominately subbaccalaureate occupations that decreased in labor market share, predominately subbaccalaureate occupations that increased in labor market share, professional occupations that increased in labor market share, and an expectation to not be working. None of the jobs in the professional category decreased in share of labor market. In addition, we examined the change in median earnings for each occupational category in Appendix A, and find that the occupations that declined in labor market share also declined in earnings value.

*Educational Attainment:* We used each participant's highest self-reported educational degree attained from surveys administered in 1982 through 1992, supplemented with degree attainment information listed in the postsecondary transcript collection in 1986 and 1992. For our analysis, the educational attainment categories are less than high school, high school diploma (reference), some college, or Bachelor's degree or more. Those who hold an associate's degree were coded in the "some college" category.

*Occupational Attainment:* Four years following each cohort's expected graduation (1984 for the senior cohort, 1986 for the sophomore cohort), the students were asked to report their current or most recent job. Each job was converted to a SOC code that we matched to the four broad occupational categories as described in the occupational expectations.

*Early Mental Health:* We condition on two indicators of adolescent mental health as early indicators of mental distress: depressive symptoms and locus of control. Depressive symptoms come from the following question: "During the past month, have you felt so sad, or had so many problems, that you wondered if anything was worthwhile?" We use a categorical indicator of whether the student reported having emotional distress never (the reference), once this month, or more than once this month. The locus of control scale indicates how much individuals feel they have control over what happens to them, with higher values indicating more perceived internal control.

*Religiosity:* Integration into and regulation by religious communities is an important part of Durkheim's original theory. Empirical work has found that how involved one is in religions is related to suicide (Pescosolido and Georgianna 1989), thus we condition on how often the adolescent reported attending religious services in the base year survey. Responses were coded

as never attending religious services, attending less than weekly, or attending at least once a week.

*Academic Achievement:* We consider two indicators of academic achievement in high school to condition on selection into occupational expectations: (1) whether the respondent took advanced math, defined as taking Algebra 1 or above, and (2) math and verbal composite test score.

*Background Controls:* We control on factors that are possibly related to both occupational expectations and midlife mortality, including highest parents' educational attainment, race, and an indicator for the survey cohort.

## Analytic Plan

Our analysis examines the early life patterns that are related to death by suicide and substance abuse in two steps. First, we describe statistics of the full sample, and by type of mortality. Then we predict mortality with multinomial logistic regressions, where dying by suicide, dying by substance abuse, and dying by other causes are compared to surviving until midlife. The results of our analyses are presented as relative risk ratios (RRRs). In Table 2a, we examine the relationship between educational attainment, race, and mortality to speak to the previous research on deaths of despair. Then, in Table 2b, we estimate three models, first with occupational expectations and early life indicators of socioeconomic status, followed by a model conditioning on mental health, religiosity, and academic achievement. We then add educational and occupational attainment in early adulthood to the final model. We use post-estimation techniques to examine mediation, since RRRs cannot be compared across models. Our results are weighted and use clustered standard errors at the school-level to account for the sampling design

within schools. We use mean/mode imputation with missing flags for any missing on independent variables.

Given that we are estimating a rare outcome, we present parsimonious models to retain statistical power. We performed a number of robustness checks to understand whether the patterns we observe are driven by other observable factors related to occupational expectations, educational attainment, and mortality risk. We describe these analyses (available upon request) in more depth after we present our main models.

## Results

Table 1a presents the descriptive statistics of our full sample and Table 1b presents our sample distribution by mortality. Nearly half of adolescents in our sample expected a professional occupation and about one-third expected an occupation that declined in labor market share in adulthood. However, this pattern is flipped for those who died by suicide or substance abuse; nearly half expected an occupation that declined in adulthood, significantly more than those who survived to midlife. In contrast, expecting a subbaccalaureate occupation that increased in labor market share is similar across those who survived to midlife and those who died by substance abuse and suicide.

Table 1 about here

The majority of individuals in our sample did not attain any education past high school and about 21% had received a bachelor's degree by early adulthood. As noted above, educational attainment is protective against mortality in general, but the pattern differs by type of mortality. Those who died by suicide were more likely to have only completed high school or less. About 70% of those who died by suicide had a high school diploma, compared with about 60% of those who survived to midlife. Men who died by other causes also completed less schooling.

Four years out of high school, most of the men in our sample were employed in an occupation that increased in labor market share. Additionally, those who died by substance abuse and suicide were less likely to be not employed compared to those who survived to midlife and those who died by other causes.

There are a few notable differences among groups in the background characteristics as well. On average, adolescents with lower than average locus of control have higher risk of death by substance abuse than those who survived to midlife. In addition, those whose parents had lower levels of education were more likely to die by suicide and those whose parents had higher levels of education were more likely to die by substance abuse. Lastly, white individuals are overrepresented among deaths by suicide and underrepresented by deaths by substance abuse compared with those who survived to midlife. The latter is largely driven by the overrepresentation of Hispanic individuals in deaths by substance abuse. We will save speculation about why patterns may differ by cause of death for the discussion.

Next, we examine the relationship between educational attainment, race, and deaths of despair in Table 2a, which presents RRRs from multinomial logistic regressions predicting mortality in adulthood, with surviving to midlife as the reference. We find some evidence consistent with Case and Deaton (2015), that mortality by suicide and substance abuse is concentrated among those with lower levels of education, but there nuances in the patterns we observe. First, receiving a bachelor's degree is protective of mortality by suicide and other causes, but it is not statistically significantly related to mortality by substance abuse. Second, receiving less than a high school diploma is a risk factor for death by substance abuse and other causes, but it is not significantly related to death by suicide. These results suggest that there is

nuance in the link between educational attainment and deaths of despair, which may be masked in analyses that combine these two causes of death.

Table 2a about here

Next, we examine the relationship between occupational expectations and mortality in Table 2b. Conditioning on race and parents' education in model 1, adolescent men who expected an occupation that declined in labor market share in adulthood have between 2 and 3 times the risk of suicide or substance abuse mortality, compared to those who expected a professional occupation that increased in labor market share. In the second model in Table 2b, we add factors that may be related to both occupational expectations and mortality, including mental health, academic achievement, and religiosity measured during adolescence. We find that there is a substantial, significant association between expecting an occupation that declined in labor market share and mortality by substance abuse or suicide even when considering these factors. Few other coefficients reach statistical significance, but some patterns we observed from the descriptive statistics remain. Hispanic individuals and those whose parents went to college have significantly higher risks of mortality by substance abuse than white individuals and those from less educated families. Although test scores and course-taking appear to be protective of mortality by other causes, these indicators of academic achievement are not statistically significantly related to mortality by suicide or substance abuse in adulthood. In fact, test scores are positively associated with death by suicide in the multivariate models. We find confirmation of our first hypothesis; adolescents who expected an occupation that declined in labor market share in adulthood have more than twice the risk of death by suicide or substance abuse relative to those surviving to midlife and to those who expected a professional occupation, even when conditioning on early life factors.

Table 2b about here

The last model examines whether educational and occupational attainment contribute to the relationship between occupational expectations and mortality by suicide or substance abuse. In model 3, we do not find significant mediation of the association between expecting an occupation that declined in labor market share and mortality by suicide or substance abuse, however, the point estimate for suicide does decrease to marginal significance. Although bachelor's degree attainment is protective against mortality by other causes, it is only marginally significantly related to death by suicide and does not appear to protect against mortality by substance abuse. Occupational attainment in early adulthood is not significantly associated with mortality in adulthood. Thus, we find partial support for hypothesis 2a—that educational attainment protects against suicide—and hypothesis 2b—that educational and occupational attainment decreases the association between occupational expectations and becomes marginally statistically significant. However, there is no evidence for mediation.

*Robustness Checks*

Our data are uniquely suited to examine the early individual-level factors that predict deaths of despair, but our analytic methods are limited by the number of our sample members who died by suicide or substance abuse before around age 50. We chose to display the most parsimonious models to focus on the relationship to occupational expectations, but we also performed a number of ancillary analyses to test the robustness of our findings. We performed analyses using the Firth method, a logistic regression method that reduces small-sample bias in estimates of outcomes with low probabilities, and our results are similar (King and Zeng 2001). We also examined possible sources of endogeneity. Below, we summarize additional analyses

we performed to consider alternative explanations for the trends we observe. These analyses are available upon request.

Given the importance of an individual's local community both in theory on suicide and in individuals' labor market experiences, we considered the role of the community specific labor market in shaping individuals' occupational expectations and labor market opportunities in early adulthood. We examined whether county-level indicators of the percent employed in blue-collar occupations in 1980 and the change in the percent employed in blue-collar occupations between 1980 and 1990 account for our results. We find that the relationship between occupational expectations and mortality by suicide or substance abuse remains when these indicators of community labor market opportunities are included in the model, suggesting that the macro changes in the job share of occupations may have played more of a role in deaths of despair than local labor market conditions. Community labor market may moderate the association between occupational expectations and mortality by suicide or substance abuse, but there were too few deaths by suicide or substance abuse within different types of community labor markets to accurately estimate this relationship.

Our theory suggests that unmet occupational expectations due to changes in the labor market play an important role in predicting mortality by suicide or substance abuse by midlife, but we may be capturing unmet educational expectations instead. To test for this possibility, we estimate whether those who expected to complete a bachelor's degree but did not complete the degree (or enter college) by early adulthood are more likely to die by suicide or substance abuse than those who reached their educational expectations in early adulthood. For this analysis, we combined the samples of men and women because the theory is not explicitly tied to the gendered nature of work. As with other research on unmet educational expectations and mental

health outcomes (Reynolds and Baird 2010), we do not find that unmet educational expectations increases risks of suicide or substance abuse in midlife.

It is possible that the relationships we observe are due to expecting a subbaccalaureate occupation in general. Note in Table 1b there is no bivariate relationship between mortality and expecting an increasing subbaccaluarate occupation. Our main models compare expecting a subbaccaulaureate occupation that declined in labor market share with expecting a professional occupation. To test whether the education level of the occupation instead of the changing labor market share drives our results, we combine both subbacalaurate and professional occupations that increased in labor market share during this time into one category, and compare that to occupations that declined in labor market share. Our results are robust to this alternative model specification, but standard errors are inflated due to the heterogeneity of the reference category.

Another possible source of endogeneity is prior mental health. Mortality by suicide in particular may be linked to depression and mental disorders. We do have two measures in our models to condition on these factors, but there are other possibilities. We examined the bivariate relationship between all of the measures within the base year survey in HS&B that theoretically may be related to suicide and mental health issues (such as discipline problems, family support, and absenteeism) and suicide. None of these indicators have a significant bivariate relationship to suicide. These ancillary results suggest that patterns of mental health risk behaviors in adolescence are not significantly associated with suicide risk after early adulthood, at least that could be detected with our sample. Throughout all of our robustness checks, our original finding holds: adolescent men who expect an occupation that decreases in labor market share during adulthood have higher risk of suicide and substance abuse.

## Discussion

Recent research has heightened national attention to deaths by suicide and substance abuse, and the opioid epidemic. Most public health strategies to counteract these increases in mortality have focused on real-time strategies, such as decreasing access to opioids, increasing access to suicide prevention, and increasing supplies of overdose prevention drugs. We take a life course perspective to examine how adolescent occupational expectations are related to risks of death by suicide or substance abuse in adulthood. Building from Durkheim's ([1897] 1951) theory of structural integration and suicide and recent research encouraging a deeper emphasis on social psychological links between unmet expectations and suicide (Mueller and Abrutyn 2016), we argue that adolescent occupational expectations serve as a signal of cultural integration that regulates life plans in ways that are meaningful for later mental health. Changes in the labor market that limit opportunities for expected plans to unfold may harm adult wellbeing and thus contribute to suicide. We additionally considered the potential for educational and occupational attainment to attenuate the relationship between declining opportunity to meet occupational expectations and risk of deaths of despair. And we examined differences between deaths recorded as suicide or substance abuse.

Overall, our results suggest that adolescents who expect an occupation that later declines in labor market share are more likely to die by suicide and substance abuse in adulthood. Given that men were more likely to expect the occupations that declined during this period and die by suicide at higher rates than women (Hawton 2000), we lack statistical power to perform an analysis of mortality for women; thus we evaluated our theoretical propositions on an all male sample. Our estimates provide suggestive evidence of a possible pathway to increased rates of these types of mortality for men. Expecting and being prepared to enter a specific set of

occupations that held few job opportunities in adulthood may lead to more economically precarious lives and experiencing the stress and strain that can culminate in substance abuse or suicide (Schneider and Harknett 2019; Roberts et al. 2013). We underscore that our findings are not definitive. As one of the first analyses to match individual-level economic and education factors and mortality to macro-level changes in the labor market, we think this paper provides an important first step to pinpointing how educational training to position people to adapt to labor market changes may be a key, but generally overlooked, tool for suicide and substance abuse prevention. Below, we suggest a few patterns worth exploring in more detail in future research.

First, we find that men who expected occupations that declined in labor market share were more likely to die by suicide or substance abuse during adulthood. We hypothesize that this link may be related to men not being able to live up to their expectations, both financially and in relation to their work identity. In Case and Deaton's (2017) broad analysis of suicide and substance abuse trends, they suggest a similar pathway of not being able to provide for a wife and family as a possible mechanism. Although we do not explicitly test this possibility, we view it as an important direction for future research. These declining jobs are not only male-dominated, but also stereotypically masculine. Other research has noted that the explicitly masculine features of these occupations are what made them particularly appealing to certain men (Willis 1981). Future research should attempt to unpack how failure to meet expectations matters, and specifically, whether failure to meet certain kinds of expectations—be they gender-role expectations or occupational expectations—predict deaths of despair. This sort of knowledge is crucial to designing effective intervention strategies.

Second, as others have found, we find that educational attainment is a significant predictor of mortality in general, and suicide in particular, but our findings in regards to death by

substance abuse and educational attainment run contrary to other theoretical explanations. Yes, those without a college degree are more likely to die by substance abuse than to survive to midlife, but individuals who died by this cause are more highly educated than those who died by other causes. One possible explanation is that we estimate early mortality, from age 25 to around age 50, whereas most research on the trends of substance abuse deaths are concentrated among those in midlife (ages 45 to 54). The earlier deaths may have occurred for those from higher status backgrounds who had more access to opioids, alcohol and other drugs earlier in life before the expansion of these drugs. In addition, pain management in older ages often is the spark for opioid use, and abuse, and so the earlier patterns we observe may not address this pathway to drug poisoning (Dasgupta et al. 2018).

On the other hand, these patterns may be driven by factors that occur postmortem; individuals from advantaged backgrounds and with a college degree may be less likely to be labeled as dying by "suicide" if they die by drug abuse than those from less advantaged backgrounds. There is evidence that families sometimes pressure medical examiners to render a certain cause of death (Timmermans 2005); to the extent that well-educated families are better able to do this, we may see systematic bias in how causes of death are determined. The surprising higher rate of Hispanic deaths by drug abuse compared to suicide brings this into question as well. Religion may play a role, in that those from Catholic backgrounds may be less likely to want a death in the family to be labeled as a suicide and Hispanics in our sample have a high proportion of Catholics. We do not have the sample size to check these patterns, or to test this hypothesis, but it is an important direction for future research. Clearly, the life course processes we are investigating involve complexities that are difficult to untangle empirically.

Future research should be cautious when studying the different types of deaths of despair because of these disparities in family background and educational attainment.

Though there is certainly more to uncover about the relationship between the labor market, expectations, gender, and deaths by suicide and substance abuse, our study reveals a powerful link between early life occupational expectations and adult mental health that is largely understudied in the existing literature on suicide and substance use. Additionally, because labor market changes are becoming more frequent, understanding the complex ways the economic world shapes individual's mental health and mortality risk is absolutely essential. New economic shifts, particularly from robotics, artificial intelligence (AI), the internet, and other sources of change in the near future, are leaving new groups at risk of these deaths of despair. For example, the expansion of rideshare companies is decreasing the security of traditional taxicabs in New York City, which some news outlets have tied to an increase in deaths by suicide for taxicab drivers (Fitzsimmons 2018; Sadeque 2018). These trends are likely to continue when autonomous vehicles become commonplace. In upstate New York and Vermont, authorities have set up a suicide hotline for dairy farmers experiencing low prices of milk because of an over-supply internationally (Smith 2018). Additionally, as AI makes low status jobs, including service jobs and some professional jobs, in lower demand, people whose identity and financial success rely on specific occupations may be at increased risk of suicide. Many technology companies that are on the cutting edge of these new technologies actually recognize these potentials and support a universal basic income for all Americans (Lowrey 2018). Entrepreneurial "creative destruction" within the economy may have the power to destroy people's lives as well.

There is some evidence that having better economic supports for workers can decrease suicide risks. Research at the country (Stuckler et al. 2009; Reeves et al. 2015) and state (Cylus,

Glymour and Avendano 2014) levels have found that heightened suicide risks associated with rises in unemployment are attenuated in areas that have more economic supports, such as labor market training programs, transition planning for youth, welfare programs, and unemployment benefits. Our findings provide valuable empirical evidence of the link between occupational expectations, labor market fluctuations, and deaths of despair, both to reduce mortality risks for those in vulnerable occupations and to improve education such that all people can thrive or at least survive in an ever-changing economy.

ENDNOTES

[1] N's rounded to nearest 10 per National Center for Education Statistics (NCES) regulations.

[2] Suicide is indicated by ICD9 codes (E905-E959) and ICD10 codes (U03, X60-X84, Y87). Death by substance abuse is indicated by ICD 9 codes (571, 850-858, 962, 980) and ICD10 codes (70, K73, K74, X40-X45, X85, 410-415).

[3] To match the occupational expectations to occupational categories, two researchers independently matched Standard Occupational Classification (SOC) codes for each job reported by the census to one of the 16 HS&B occupational categories, excluding homemakers. Discrepancies were discussed and resolved.

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Table 1a. Descriptive Statistics

| **Mortality** | *Proportion/Mean* | *S.D.* | % Missing |
|---|---|---|---|
| Alive | 0.94 | | 0.0% |
| Died: Other | 0.05 | | |
| Died: Suicide | 0.01 | | |
| Died: Substance Abuse | 0.01 | | |
| **Expectations** | | | |
| Occupational Expectations | | | 0.0% |
| Declining Sub Baccalaureate | 0.33 | | |
| Increasing Sub Baccalaureate | 0.17 | | |
| Professional† | 0.49 | | |
| No work | 0.01 | | |
| **Background Controls** | | | |
| Seniors | 0.40 | | 0.0% |
| Race/Ethnicity | | | 0.0% |
| White† | 0.74 | | |
| African American | 0.11 | | |
| Hispanic | 0.12 | | |
| Other | 0.03 | | |
| Parent Education | | | 9.3% |
| High School or less† | 0.46 | | |
| Some college (or vocational) | 0.28 | | |
| BA/BS+ | 0.26 | | |
| **High School Controls** | | | |
| Depressive Thoughts in last month | | | 9.3% |
| Never† | 0.45 | | |
| Once | 0.30 | | |
| More than once | 0.25 | | |
| Religious Service Attendance | | | 14.1% |
| Never† | 0.23 | | |
| Less than once a week | 0.37 | | |
| At least once a week | 0.40 | | |
| Never took Algebra I or Higher | | | |
| Locus of Control | -0.05<br>*min -3.03* | 0.69<br>*max 1.27* | 7.4% |
| Test Scores | 50.63<br>*min 27.41* | 9.05<br>*max 71.36* | 10.2% |

Table 1a. Continued

| **Early Adulthood Attainment** | | |
|---|---|---|
| Highest Level of education | | 2.0% |
| Less than High School | 0.04 | |
| High School† | 0.59 | |
| Some Extended Education | 0.16 | |
| Bachelor's Degree or more | 0.21 | |
| Occupation in 4th year after High School | | 10.0% |
| Declining | 0.04 | |
| Increasing† | 0.54 | |
| Professional | 0.13 | |
| Not Employed | 0.29 | |
| *N* | *11,890* | |

† = Reference Category

Table 1b. Descriptive Statistics by Mortality

| | Alive | Died: Suicide | Died: Substance Abuse | Died: Other |
|---|---|---|---|---|
| **Expectations** | | | | |
| Occ: Declining Sub Baccalaureate | 0.33 | 0.50* | 0.49* | 0.38 |
| Occ: Increasing Sub Baccalaureate | 0.17 | 0.19 | 0.17 | 0.15 |
| Occ: Professional† | 0.49 | 0.32* | 0.34 | 0.45 |
| Occ: No work | 0.01 | - | 0.003 | 0.02 |
| **Background Controls** | | | | |
| Seniors | 0.40 | 0.39 | 0.47 | 0.44 |
| Race: White† | 0.74 | 0.81 | 0.64 | 0.63* |
| Race: African American | 0.11 | 0.08 | 0.09 | 0.16* |
| Race: Hispanic | 0.12 | 0.08 | 0.26* | 0.17* |
| Race: Other | 0.03 | 0.02 | 0.02 | 0.04 |
| Parent Ed: High School or less† | 0.45 | 0.50 | 0.25* | 0.53* |
| Parent Ed: Some college (or vocational) | 0.28 | 0.33 | 0.32 | 0.29 |
| Parent Ed: BA/BS+ | 0.27 | 0.18 | 0.43* | 0.18* |
| **High School Controls** | | | | |
| Depression: None† | 0.45 | 0.33 | 0.38 | 0.42 |
| Depression: Once | 0.30 | 0.36 | 0.41 | 0.27 |
| Depression: More than once | 0.25 | 0.32 | 0.27 | 0.31* |
| Religiosity: None† | 0.22 | 0.33 | 0.29 | 0.25 |
| Religiosity: Less than once a week | 0.37 | 0.27 | 0.43 | 0.38 |
| Religiosity: At least once a week | 0.4 | 0.40 | 0.27 | 0.38 |
| Never took Algebra I or higher | 0.22 | 0.32 | 0.31 | 0.36* |
| Locus of Control | -0.04 | 0.01 | -0.28* | -0.15* |
| (Standard Deviation, locus) | (0.68) | (0.76) | (0.70) | (0.71) |
| Test Scores | 50.81 | 52.06 | 49.06 | 47.20* |
| (Standard Deviation, test scores) | (9.03) | (9.51) | (9.61) | (8.53) |

Table 1b. Continued.

| | | | | |
|---|---|---|---|---|
| **Early Adulthood Attainment** | | | | |
| Education: Less than High School | 0.04 | 0.04 | 0.10* | 0.08* |

| | | | | |
|---|---|---|---|---|
| Education: High School† | 0.59 | 0.72 | 0.57 | 0.70* |
| Education: Some Extended Education | 0.16 | 0.16 | 0.19 | 0.15 |
| Education: Bachelor's Degree or more | 0.22 | 0.08 | 0.14 | 0.07* |
| Occupation: Declining Occupation | 0.04 | 0.05 | 0.01 | 0.03 |
| Occupation: Increasing Occupation† | 0.54 | 0.66 | 0.66 | 0.56 |
| Occupation: Professional Occupation | 0.14 | 0.09 | 0.13 | 0.11 |
| Occupation: Not Employed | 0.29 | 0.19 | 0.21* | 0.30 |
| *N* | *11,180* | *60* | *60* | *580* |

† = Reference Category

*Significantly different from the Alive group. For example, those who died by suicide were more likely to expect a declining occupation than those who were still alive by midlife.

Table 2a. Multinomial Logistic Regressions Predicting Mortality Relative to Surviving to Midlife, Conditioning on Educational Attainment (Reporting Relative Risk Ratios)

| VARIABLES | *Suicide* | *Substance* | *Other* |
|---|---|---|---|
| **Race** | | | |
| Race: Black | 0.595 | 0.881 | 1.513** |
| [ref. white] | (0.271) | (0.460) | (0.221) |
| Race: Hispanic | 0.544 | 2.343* | 1.412* |
| | (0.205) | (0.860) | (0.235) |
| Race: Other | 0.591 | 0.704 | 1.791 |
| | (0.606) | (0.468) | (0.667) |
| **Educational Attainment** | | | |
| Education: Less than high school | 0.967 | 2.447+ | 1.773+ |
| [ref. high school] | (0.609) | (1.304) | (0.538) |
| Education: Some Extended Education | 0.816 | 1.259 | 0.788 |
| | (0.375) | (0.550) | (0.138) |
| Education: Bachelor's Degree | 0.276+ | 0.755 | 0.263*** |
| | (0.184) | (0.416) | (0.0594) |
| Constant | 0.0548*** | 0.00783*** | 0.00514*** |
| | (0.00546) | (0.00171) | (0.00131) |

Robust standard errors in parentheses. N=11,890. Model includes an indicator of panel cohort and a flag for missing data. *** p<0.001, ** p<0.01, * p<0.05., + p<.1

Table 2b. Multinomial Logistic Regressions Predicting Mortality Relative to Surviving to Midlife, Conditioning on Occupational Expectations (Reporting Relative Risk Ratios)

| | 1 | | | 2 | | | 3 | | |
|---|---|---|---|---|---|---|---|---|---|
| VARIABLES | *Suicide* | *Substance* | *Other* | *Suicide* | *Substance* | *Other* | *Suicide* | *Substance* | *Other* |
| **Occupational Expectations** | | | | | | | | | |
| [ref. Professional] | | | | | | | | | |
| "Declining Occupation" | 2.200* | 2.936** | 1.117 | 2.550* | 2.391* | 0.872 | 2.133+ | 2.125* | 0.795 |
| | (0.875) | (1.061) | (0.160) | (1.173) | (0.856) | (0.135) | (0.931) | (0.727) | (0.120) |
| "Increasing Occupation" | 1.610 | 1.673 | 0.890 | 1.723 | 1.584 | 0.828 | 1.659 | 1.515 | 0.782 |
| | (0.823) | (0.845) | (0.166) | (0.891) | (0.789) | (0.155) | (0.818) | (0.723) | (0.147) |
| **Socioeconomic Status** | | | | | | | | | |
| Race: Black | 0.655 | 1.226 | 1.617** | 0.929 | 1.099 | 1.256 | 0.878 | 1.204 | 1.247 |
| [ref. white] | (0.300) | (0.650) | (0.234) | (0.417) | (0.651) | (0.205) | (0.420) | (0.713) | (0.203) |
| Race: Hispanic | 0.538+ | 3.125*** | 1.561** | 0.730 | 2.679* | 1.251 | 0.722 | 2.723* | 1.228 |
| | (0.200) | (1.075) | (0.259) | (0.282) | (1.030) | (0.210) | (0.281) | (1.071) | (0.204) |
| Race: Other | 0.610 | 0.780 | 1.853+ | 0.677 | 0.664 | 1.587 | 0.584 | 0.696 | 1.604 |
| | (0.635) | (0.519) | (0.678) | (0.700) | (0.449) | (0.575) | (0.625) | (0.475) | (0.586) |
| Parents' Education: | | | | | | | | | |
| Some college | 1.147 | 2.655* | 0.928 | 1.115 | 2.929* | 0.999 | 1.135 | 3.056** | 1.016 |
| [ref. high school] | (0.455) | (1.127) | (0.140) | (0.452) | (1.228) | (0.153) | (0.453) | (1.282) | (0.155) |
| Parents' Education: | | | | | | | | | |
| Bachelor's degree or above | 0.706 | 4.643*** | 0.646* | 0.624 | 5.824*** | 0.773 | 0.762 | 6.462*** | 0.874 |
| | (0.378) | (1.836) | (0.117) | (0.349) | (2.460) | (0.146) | (0.389) | (2.769) | (0.167) |
| **Early Life Factors** | | | | | | | | | |
| Locus of Control | | | | 1.264 | 0.676 | 1.062 | 1.294 | 0.674 | 1.078 |
| | | | | (0.488) | (0.169) | (0.116) | (0.482) | (0.170) | (0.118) |
| Depressive Symptoms: | | | | | | | | | |
| Yes, once | | | | 1.720 | 1.695 | 0.904 | 1.628 | 1.667 | 0.887 |
| [ref. Never] | | | | (0.729) | (0.743) | (0.131) | (0.699) | (0.719) | (0.130) |
| Depressive Symptoms: | | | | | | | | | |
| More than once | | | | 1.848 | 1.257 | 1.173 | 1.795 | 1.206 | 1.119 |
| | | | | (0.792) | (0.634) | (0.177) | (0.766) | (0.619) | (0.168) |
| Religious Attendance: | | | | | | | | | |
| Less than weekly | | | | 0.534 | 0.865 | 0.963 | 0.559 | 0.865 | 0.997 |
| [ref. Never] | | | | (0.242) | (0.401) | (0.164) | (0.245) | (0.396) | (0.170) |

| Table 2b [cont] | *Suicide* | *Substance* | *Other* | *Suicide* | *Substance* | *Other* | *Suicide* | *Substance* | *Other* |
|---|---|---|---|---|---|---|---|---|---|
| Religious Attendance: | | | | | | | | | |
| Weekly or more | | | | 0.760 | 0.505 | 0.952 | 0.853 | 0.498 | 1.013 |
| | | | | (0.320) | (0.253) | (0.163) | (0.352) | (0.250) | (0.176) |
| Course-taking: | | | | | | | | | |
| Didn't take Algebra 1 | | | | 1.963 | 1.553 | 1.456* | 1.785 | 1.500 | 1.379* |
| [ref. Took Algebra 1 or above] | | | | (0.854) | (0.701) | (0.226) | (0.740) | (0.670) | (0.217) |
| Test Scores | | | | 1.050+ | 1.009 | 0.972** | 1.063* | 1.014 | 0.983 |
| | | | | (0.029) | (0.031) | (0.010) | (0.029) | (0.034) | (0.010) |
| **Early Adulthood Attainment** | | | | | | | | | |
| Education: Below high school | | | | | | | 1.082 | 2.180 | 1.596 |
| [ref. high school] | | | | | | | (0.691) | (1.301) | (0.475) |
| Education: Some College | | | | | | | 0.855 | 1.318 | 0.818 |
| | | | | | | | (0.409) | (0.576) | (0.144) |
| Education: Bachelor's Degree | | | | | | | 0.299+ | 0.831 | 0.309*** |
| | | | | | | | (0.198) | (0.552) | (0.077) |
| Occupational: | | | | | | | | | |
| Worked in "Declining" | | | | | | | 1.535 | 1.644 | 0.835 |
| [ref. worked in "Increasing"] | | | | | | | (0.743) | (0.778) | (0.138) |
| Occupational: | | | | | | | | | |
| Worked in "Professional" | | | | | | | 1.012 | 1.511 | 0.866 |
| | | | | | | | (0.668) | (0.934) | (0.192) |
| Occupational: Not Employed | | | | | | | 2.674 | 0.294 | 0.736 |
| | | | | | | | (2.471) | (0.220) | (0.222) |
| Constant | | | | 0.000*** | 0.001*** | 0.187** | 0.000*** | 0.000*** | 0.149** |
| | | | | (0.000) | (0.001) | (0.109) | (0.000) | (0.001) | (0.089) |

Robust standard errors in parentheses. N=11,890. All models include an indicator of panel cohort, flags for missing data, and expecting no work in adulthood. *** p<0.001, ** p<0.01, * p<0.05., + p<.1

Appendix A: Categories of Occupational Expectations and Change in Labor Market Share

| Analytic Occupational Categories | HS&B Occupational Categories | Example Occupations (Most Common) | % Change in Labor Market Share from 1980-1990 (Men & women) | % of Workers in the Occupational Categories that are Men |
|---|---|---|---|---|
| Declining Share of Labor Market (Subbacalaureate) | Clerical | Secretary, Shipping Clerk | -5.5% | 21.3% |
| | Craftsman | Carpenter, Mechanic | -7.9% | 93.8% |
| | Farmer, Farm manager | Farmer (owner) | -9.4% | 90.3% |
| | Laborer | Farmer laborer, Construction | -8.5% | 82.5% |
| | Military | Military | -15.4% | 91.1% |
| | Operative | Drivers, Machine operator | -17.2% | 70.4% |
| Increasing Share of Labor Market (Subbacalaureate) | Protective | Police, Security | +11.6% | 88.6% |
| | Service | Janitor, Waitress/Waiter | +.5% | 35.9% |
| | Technical | Drafter, Technician | +16.3% | 59.4% |
| | Sales | Salesperson | +3.3% | 48.4% |
| Professional (Baccalaureate) | Manager, admin | Manager, Administrator | +2.3% | 73.9% |
| | Professional 1 | Accountant, Nurse | +16.3% | 54.1% |
| | Professional 2 | Lawyer, Doctor | +21.8% | 75.3% |
| | School Teacher | Primary School Teacher | +5.3% | 29.2% |
| | Proprietor | N/A | N/A | N/A |
| Not Working | Homemaker | N/A | N/A | N/A |
| | No work | N/A | N/A | N/A |