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Academic Preparation in High School and Gendered Exposure to Economic Insecurity at Midlife

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Academic Preparation in High School and Gendered Exposure to Economic Insecurity at Midlife

by

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Dedication

This dissertation is dedicated to the memory of my brother, Patrick Joseph Coffman.

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Abstract

Academic Preparation in High School and Gendered Exposure to Economic Insecurity at Midlife

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The shifting of risk from institutions to individuals in the new economy and increasing occupational polarization has led to greater prevalence and heightened consequences of economic insecurity for U.S. workers in the absence of universal social safety nets. Using data from the new midlife follow-up of the High School and Beyond study, I investigate the link between individuals' academic preparation in high school and their risk of economic insecurity at midlife in the context of a stratified and changing economy. I focus on how individuals' pre-labor market skills influence their long-term economic outcomes, with particular attention to how gendered opportunity structures shape men's and women's experiences of economic vulnerability. I examine three dimensions of economic insecurity: exposure to bad jobs, labor force attachment, and subjective economic insecurity. Taking a longer view of the link between education and economic outcomes, my findings reveal how high school prepares students for resilience across the life course. My research can increase our understanding of how the interaction between workers' pre-labor market characteristics and a stratified labor market contribute to significant economic inequalities among middle-aged workers.

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Chapter 1: Introduction

MOTIVATION

In recent decades, the U.S. labor market has become increasingly polarized such that there are large concentrations of "good" and "bad" jobs and few in the middle (Acemoglu and Autor 2011; Kalleberg 2011; Mouw and Kalleberg 2010). This polarization has occurred in the context of increasing individualization of risk in the new economy, with risk shifting away from institutions and toward individuals across societal domains (Hacker 2008). These trends have led to greater precarity for workers and heightened consequences of economic insecurity in the absence of strong social safety nets. The risks and burdens of economic insecurity have implications for all individuals, but they pose serious hardship for people who experience economic insecurity later in life, when they have fewer opportunities for recovery.

Economic insecurity in the pre-retirement years can have severe financial consequences because that is the period in which people accumulate most of their personal retirement savings, which are becoming vital for secure retirements in the face of longer life expectancy and declines in pensions and retiree health benefits (Mermin, Johnson, and Murphy 2007; Mitchell and Moore 1998; O'Rand 2011; Virick 2011). Younger individuals have more time and opportunities to recover and improve their situation if they encounter economic hardships due to bad jobs, health problems, or other financial difficulties. However, middle-aged individuals who experience these same hardships are not only older and have less time to recover; they may also bear significant financial and familial burdens that limit the options available to them.

A person's risk of economic insecurity is shaped by the interaction between their individual characteristics and opportunity structures in a stratified and segregated society. Despite significant progress toward gender parity in the past few decades, economic opportunities remain highly gendered, with women continuing to lag behind men (England 2010). The persistence of occupational gender segregation, stagnation in the gender wage gap, and lingering vestiges of gender essentialist ideologies at work and in the home underscore the

importance of gender in influencing individuals' opportunities. People's opportunities and life chances are also now largely dependent on their educational attainment. A bachelor's degree is becoming increasingly necessary for economic security because it gives workers access to good jobs in the polarized economy (Carnevale and Desrochers 2002; Goldin and Katz 2009; Hout 2012; Sorenson 2000). On the other hand, individuals without college degrees have limited options for decent work considering that the mid-skilled trades that once provided well-paying, secure employment to high school graduates have largely declined (Acemoglu and Autor 2011).

Understanding the factors that may protect people from economic insecurity later in life involves recognizing that individuals face different opportunity structures. How well an individual navigates within this context may depend in part on the skills they bring into adulthood, as these skills influence their life chances and imbue them with resources for managing their career, health, and finances (Halpern-Manners et al. 2015; Raymo et al. 2011). High schools are in a position to provide all individuals with the skills necessary to stay afloat and achieve economic security in the long run, whether people continue on to postsecondary education or enter the workforce.

With the shift from a manufacturing-based to a knowledge-based economy, the importance of cognitive skills has increased in occupations across the educational spectrum (Bozick and Dalton 2013; Bozick, Srinivasan, and Gottfried 2017; Gamoran 1994; Murnane, Willett, and Levy 1995). Further, the individualization of financial risk and expansion of the financial economy has increased the need for and access to consumer finance and financial products (Fligstein and Goldstein 2015). However, people need the cognitive skills required to navigate this landscape, or they risk dire financial consequences that may last or even accumulate across the life course. Considering the rising importance of cognitive skills across different dimensions of economic life, more rigorous academic preparation in high school may position students to avoid economic insecurity in the long run by fostering these skills.

The advanced academic curriculum that supports cognitive skill development has traditionally been considered "college preparatory" coursework because higher cognitive skills

were necessary for *college*. This rigorous curriculum was not crucial to the economic success of students who could find good mid-skill jobs right out of high school that would lead to a stable, middle-class existence (Arum and Shavit 1995; Gamoran 1994). In today's economy, the decline of mid-skill jobs coupled with computerization, financialization, and rapidly-changing technology have led to the proposition that advanced academic preparation may contribute to the economic security of all students in the long run, regardless of whether they plan to go to college (Balfanz 2009; Bozick and Dalton 2013; Gamoran 1994).

In this dissertation, I examine the link between individuals' academic preparation in high school and their risk of economic insecurity later in life, in the context of a stratified and changing economy. I am interested in how individuals' pre-labor market skills and preparation influence their long-term economic outcomes and how gendered opportunity structures shape men's and women's experiences of economic vulnerability at midlife, when the consequences are profound and upward mobility unlikely. Midlife is an ideal time to study the possible economic benefits of high school coursework because returns to academic coursework and skills increase over time (Dolton and Vignoles 2002; Gamoran 1994; Grasso and Shea 1979; Murnane et al. 1995; Rose and Betts 2004). I hypothesize that pre-labor market skills and preparation may be most beneficial to workers with the greatest structural risk of insecurity. Specifically, I ask whether rigorous academic coursework in high school provides a safety net, even and especially when people do not attain the college degree often necessary to achieve economic success. It is important to understand not only how high schools prepare some students for success but how they can provide *all* students with the skills necessary to stay afloat and achieve economic security in the long run.

BACKGROUND

Structural changes in the labor market in recent decades have been characterized by a shifting of costs and the economic burden of risk from employers to employees, an increase in nonstandard work arrangements, and rising employer skill demands (Acemoglu and Autor 2011;

Hacker 2008; Kalleberg 2000, 2009; Kalleberg, Reskin, and Hudson 2000). Though this devolution of risk in the new economy increases economic insecurity for all workers, the consequences are heightened for workers in the lower end of the labor market, a segment that has grown in the polarizing economy (Acemoglu and Autor 2011; Kalleberg 2011; Mouw and Kalleberg 2010).

Lower-skilled workers are more likely to experience economic insecurity and are also less equipped to deal with the consequences, especially in the absence of social safety nets. The mid-skilled trades that once provided well-paying, secure employment to workers without college degrees have largely declined, and a bachelor's degree is becoming increasingly necessary for access to good jobs (Acemoglu and Autor 2011; Carnevale and Desrochers 2002; Goldin and Katz 2009; Hout 2012; Sorenson 2000). The hollowing out of the middle of the labor market and growth in low-wage occupations has limited the ability of individuals without bachelor's degrees to find decent work, and the decline in the real value of the minimum wage has only further increased the stakes of falling to the bottom of the labor market (McCall 2000; Moore 2018). Despite the polarization in the labor market, computerization and the shift to a knowledge-based economy has increased the importance of cognitive skills in occupations across the educational spectrum (Bozick and Dalton 2013; Bozick et al. 2017; Gamoran 1994; Murnane et al. 1995).

Because workers without college degrees are at greatest risk of economic insecurity, the increasing importance of cognitive skills points to high school as the main site of skill development for sub-baccalaureate workers. For students in the United States, high school serves as the early bookend to their transition to adulthood and the highest level of compulsory education. The end of high school represents a critical period in the life course, which sets individuals on different trajectories (Schafer, Wilkinson, and Ferraro 2013). Whether students continue on to postsecondary education or enter the workforce, the completion of high school is the starting point from which students will commence their future adult lives and careers. Though all students technically share the same starting point upon completion of high school,

they are not similarly equipped to navigate their futures. Students leave high school with the same credential but not the same skills (Bills 2003). People's skills at the completion of high school may have a particularly important relationship to long-term economic outcomes because attributes at this juncture influence subsequent pathways and choices across the life course, and returns to skills increase with labor market experience (Altonji 1995; Murnane et al. 1995; Rosenbaum et al. 1999).

High schools in the U.S. have historically provided students with the education and skills they need to transition to their adult lives, whether they enter higher education or the labor force after high school. Decades ago, this meant curricular stratification through formal tracking, which prepared students for different positions in the industrial occupational structure (Raudenbush and Eschmann 2015). However, recent labor market trends point to the proposition that in today's economy, college preparation and career preparation in high school may be one and the same (Balfanz 2009; Bozick and Dalton 2013; Gamoran 1994).

The advanced academic coursework that prepares students for college and leads to labor market success may be the same coursework that protects students from falling to the bottom of a polarizing economy even, and especially, when they do not finish college. My research can shed light on the possible long-term effects of curricular intensification in the "college-for-all" era of schooling, when almost all students expect to attend college but less than half attain college degrees (Rosenbaum, Stephan, and Rosenbaum 2010). Rising college costs and attrition have led to some pushback against the prescription of advanced academic preparation for all students, as this preparation may come at the expense of valuable occupational training and ultimately harm students' occupational prospects. I do not test the possibility of a tradeoff between academic and occupational coursework, but the argument that such a tradeoff would harm students' prospects is inherently gendered because it is only *men* who stand to lose if such a tradeoff existed. When students take occupational coursework in high school, women are more likely to take coursework that relates to the female-dominated, low-wage service occupations, whereas men are more likely to take blue-collar oriented coursework (Ainsworth and Roscigno 2005). Regardless, the

proliferation of technology and cognitive skill demands across the labor market coupled with the expanding role of finance in people's everyday lives suggest that academic preparation is unlikely to be a detriment to women or men in the long run.

Previous research has linked cognitive skills to a wide variety of positive economic and non-economic outcomes. Cognitive skills are important predictors of occupational attainment and earnings (Cawley, Heckman, and Vytlacil 2001; Farkas 2003), labor market and health disparities (Conti, Heckman, and Urzua 2010), and the likelihood of having a health limitation (Auld and Sidhu 2005). In addition, is it well established that cognitive skills are highly correlated with educational attainment (Adelman 2006; Aughinbaugh 2012; Joensen and Nielsen 2009; Karlson 2015; Lleras 2008). Further, previous research shows that cognitive skills matter independently of educational attainment for labor force outcomes (Kerckhoff, Raudenbush, and Glennie 2001).

Studies have shown that academic coursework leads to *positive* economic outcomes such as increased wages, faster promotions, and higher-status jobs (Altonji 1995; Bishop 1991; Gaertner et al. 2014; Joensen and Nielsen 2009; Levine and Zimmerman 1995; Rose and Betts 2004). Some studies investigating the effects of math coursework specifically have focused on the connection between math preparation and high-paying, in-demand jobs in science, technology, engineering, and mathematics (STEM) fields (Bozick et al. 2017). However, less is known about the protective effects of academic coursework against *negative* economic outcomes (Daymont and Rumberger 1982; Gamoran 1994), and it is possible that the processes that lead to good and bad outcomes may not be the same (Kalleberg and Vaisey 2005). The paucity of literature in this area coupled with curricular homogenization and intensification in the post-industrial economy make an investigation of the protective effects of academic coursework particularly relevant and timely.

In research examining the relationship between academic course-taking in high school and positive economic outcomes, the level of coursework generally seems to matter more than the number of credits (Levine and Zimmerman 1995; Rose and Betts 2004). Thus, more rigorous

academic coursework may be key in preparing students for long-term economic security, not just taking multiple years of lower-level courses. Even if basic academic skills are all that is necessary for individuals to avoid the worst economic outcomes, students who have taken advanced coursework will have had more time and opportunity to master and retain those foundational skills (Gamoran 1994; Rose and Betts 2001).

Previous studies have looked at a variety of academic subjects, but math seems to be the best predictor of future economic outcomes (Adkins and Noyes 2016; Altonji, Blom, and Meghir 2012; Dolton and Vignoles 2002; Goodman 2012; Rose and Betts 2004). Higher math skills lead to higher predicted job performance, lower rates of unemployment, and higher earnings (Bishop 1991). Measurements of math skills such as math test scores represent students' grasp of math content, which may pertain to particular jobs, but that only encapsulates one dimension of math-related skills (Rose and Betts 2001). When students take advanced math courses, they also gain logic and reasoning skills that are conducive to productivity in general (Gaertner et al. 2014; Rose and Betts 2001). Skills gained through learning advanced math may also teach students how to learn, which enables them to move up and obtain higher status positions within occupations (Rose and Betts 2001). In fact, one of the most popular explanations for a link between math and labor market outcomes is that students with better math skills might enjoy higher earnings (Bishop 1991; Joensen and Nielsen 2009; Rose and Betts 2004). Advanced math coursework prepares students for the labor market, but it also prepares them for success in higher education (Gaertner et al. 2014) and makes them more likely to go to college (Adelman 2006; Aughinbaugh 2012; Joensen and Nielsen 2009; Karlson 2015).

Though the economic benefit of higher cognitive skills or educational attainment has been widely established, the mechanism through which education is related to better outcomes is less clear, especially in terms of the role specific coursework plays. Theories on the economic benefit of schooling range from a credentialist perspective that suggests schooling imparts little or no actual beneficial skills (Collins 1979) to human capital theory that proffers skill development as the primary reason that schooling is linked to economic rewards (Becker 1962).

If schooling only has value because it provides people with a formal credential and not because it gives students skills that are valuable in the labor market, then college degree attainment would ostensibly explain most or all of the relationship between coursework and economic outcomes. I expect that credentialism is part of the reason people without college degrees are largely blocked from certain occupations and why people *with* college degrees can largely avoid the bottom of the labor market, but it would not explain variation among people with the same credential.

Assuming a relationship exists between coursework and economic outcomes, even net of credentials, does not imply a *causal* role of coursework but rather an association between coursework and some type of skills or abilities rewarded in the labor market – an association that may be due to selection, skill development, or a mixture of both. A purely functionalist perspective assumes that stratified coursework is related to stratified labor market outcomes because the coursework is how schools prepare students for occupations based on their abilities (Parsons 1959; Sorokin 1959). Reproduction theory, on the other hand, suggests that schooling reproduces existing inequalities in the occupational structure, so disparities in outcomes based on coursework are related to how differentiated curricula socialize students to accept their unequal roles in society and not students' underlying abilities (Bowles and Gintis 1976, 2002). Though vastly different explanations, both functionalist and reproduction perspectives imply that coursework is related to economic outcomes due to selection into coursework, either based on underlying abilities or status characteristics. In the U.S. school system, selection into coursework and the quality of coursework has traditionally been and remains unequal based on both ability grouping and status characteristics that circumscribe students' access to rigorous curriculum. I attempt to net out these issues to the extent possible in my models, by including a host of sociodemographic and academic covariates that contribute to selection into coursework.

Finally, human capital theory implies that coursework has value because it gives students skills that increase their productivity and lead to rewards in the labor market (Becker 1962). The coursework may teach students specific skills that apply directly to certain jobs, reasoning skills that increase general productivity, or learning skills that accelerate their acquisition of on-the-job

knowledge (Rose and Betts 2001). If education does make students more productive, both the amount and content of education they receive should influence their economic outcomes because employers will reward employees based on their skills. Another theory related to individuals' skills is signaling theory, which acknowledges that employers seek to reward skill but have limited information, so they use educational credentials as a proxy. However, instead of education enhancing an individual's skills, it merely provides a signal of their innate ability because innately more productive students will choose levels of education that provide valuable signals to employers (Spence 1974).

Empirically, these explanations are hard to differentiate in terms of returns to educational credentials or even skills, but signaling theory is a less likely explanation for an association between high school coursework and economic outcomes among people with the same level of education. It is possible that students choose levels of coursework as signals for college admissions committees, but it is less plausible that students choose coursework as signals to employers or even that such signals would be visible to employers because they are unlikely to look at high school transcripts (Bishop 1989; Rose and Betts 2001). Signaling theory does not preclude the possibility of returns to skills associated with coursework over time, but it implies the same type of selection into coursework as a functionalist explanation, such that coursework should have no value apart from students' underlying skills. Signaling theory also assumes a high level of student agency in course selection, though student curriculum choices are shaped by things beyond student control such as coursework requirements, school course offerings, school personnel, and parents (Altonji et al. 2012; Tyson and Roksa 2016). Though it is impossible to definitively distinguish between the different explanations of how coursework may relate to economic outcomes, they obviously affect the interpretation of my findings and their implications. I account for selection factors to the extent possible in my data, and any independent relationship between coursework and economic outcomes suggests that a causal relationship may exist.

To the extent that advanced course-taking leads to a college degree, I expect that women may receive greater protection from academic coursework due to women's greater returns to a college degree (DiPrete and Buchmann 2006). However, when women do *not* get a college degree, do they still benefit from advanced course-taking? Previous research has found that women receive greater returns than men to cognitive skills in general (Grogger and Eide 1995; Mitra 2002; Murnane et al. 1995; Rakitan and Artz 2015). In fact, women's pre-existing cognitive skills account for a large part of their college premium, and returns to these skills are increasing over time (Autor 2014; Grogger and Eide 1995; Murnane et al. 1995; Yamaguchi 2016). Thus, even when academic coursework does not lead to a college degree, women might receive greater economic benefits than men from their pre-market skills.

A college degree should largely insulate people against economic insecurity at midlife, so academic coursework in high school may be most consequential among people *without* college degrees, who have the greatest risk of experiencing economic insecurity. People without bachelor's degrees are largely relegated to the sub-baccalaureate labor market, which is highly gender-segregated (Ainsworth and Roscigno 2005; Carnevale et al. 2013; England 2010; Grubb 2002; Harlan and Berheide 1994; Kilbourne et al. 1994). Male-dominated and female-dominated occupations differ in terms of wages and skill demands, with male-dominated occupations paying higher wages but also demanding more manual labor. Thus, gender segregation in the sub-baccalaureate labor market may place men and women at risk for different types of economic insecurity at midlife. For instance, women may be more likely to be in worse-paying occupations, and men may be less likely to continue working in their well-paying but physically-demanding occupations. My dissertation examines different dimensions of economic insecurity to provide a more holistic look at ways in which gendered opportunity structures shape the influence of academic preparation on men's and women's long-term economic outcomes.

RESEARCH AIMS AND CHAPTER OUTLINE

This dissertation examines three sources of economic insecurity at midlife to improve our understanding of the long-term economic implications of individuals' skills and preparation in high school. I pay attention to how structural contexts and labor market stratification shape the relationship between individuals' pre-labor market characteristics and their labor force attachment, exposure to bad jobs, and subjective economic insecurity at midlife. In Chapter 2, I introduce the dataset I use in my analyses: the High School and Beyond (HS&B) study (Muller et al. 2019). This chapter will provide an overview of the dataset and explain the measures and methods common to analyses across analytic chapters.

Chapter 3, the first analytic chapter, investigates how the skills that students have at the end of high school may support long-run labor force attachment and employment. Separation from the workforce in the preretirement years can have severe and lasting consequences for individuals' economic wellbeing, regardless of the reason for non-employment. Individuals who leave high school with higher cognitive or non-cognitive skills may be more likely to be employed at midlife because they are more likely to complete college. A college degree may lead to better occupations and better health across the life course. However, higher cognitive and non-cognitive skills may support employment in ways that go beyond the benefits of a college degree, as resources that help individuals manage their health and careers.

The second analytic chapter, Chapter 4, examines whether academic preparation in high school helps men and women avoid exposure to bad jobs at midlife and how this relationship is shaped by individuals' occupational opportunities. In doing so, I look beyond workers' contemporaneous employment in bad jobs to incorporate structural risks of exposure to bad jobs. Educational attainment and gender shape individuals' access to different segments of the labor market, occupations within those segments, and jobs within the occupations. Better academic preparation may support the development of cognitive skills that can help people avoid the most precarious occupations or help them obtain better jobs within their occupations.

Chapter 5 builds on the first two empirical chapters to investigate early predictors of men's and women's subjective economic insecurity at midlife, accounting for gendered occupational and social structures. I incorporate my findings from the first two analytic chapters to assess the extent to which occupational precarity, health, and work mediate these early predictors and independently contribute to men's and women's subjective economic insecurity.

These three outcomes represent only a few of the ways in which individuals may experience economic insecurity, but they tap crucial and interrelated aspects of individuals' economic wellbeing – employment status, the economic benefits of work, and financial precarity. In a way, these dimensions are actually "layers" of progressively fine-grained measures of economic insecurity across chapters. They unfold like a decision tree, with each chapter recognizing that no branch is deterministic and presenting heterogeneous paths to insecurity. The coarsest dimension of economic insecurity is employment – people are working, or they are not; it is a simple and stark indicator of insecurity. If people have a job, insecurity then becomes more nuanced as jobs can provide different degrees of economic benefit or burden. A job does not prevent insecurity, it simply alters the mechanism and risk. Finally, the most fine-grained measure is subjective economic insecurity, which is a possible outcome on many branches and rendered more or less probable by the coarser dimensions. Together, these dimensions of insecurity reveal the complexity of economic wellbeing and diffusion of risk in an unpredictable social world.

Chapter 2: Data and Methods

This chapter explains data and methods that are common to multiple analytic chapters in this dissertation. Data and methods issues that apply to a specific chapter are discussed within that chapter.

DATA

This dissertation uses data from the High School and Beyond study (HS&B), a nationally-representative longitudinal study of students in U.S. schools (Muller et al. 2019). The original base year sample of HS&B included about 60,000[1] sophomores and seniors within 1,000 schools in 1980. A nationally representative subsample of about 15,000 sophomores and 13,000 seniors was selected as a panel and followed up in 1982, 1984, 1986, 1992 (only sophomore cohort), and 2014/15. About 60 percent of eligible cohort members answered the 2014/15 midlife follow-ups, when most sophomores were nearing 50 years old and seniors were in their early 50s. In the midlife follow-ups, most members of the sophomore and senior cohort answered a short survey with questions about their health, work, family, and education. A sub-sample of sophomore cohort members completed an extended version of the survey that asked more detailed questions about topics such as employment experiences, income and wealth, physical functioning, and retirement planning. All analyses only include sample members who completed the midlife follow-up.

Chapters 3 and 4 use the sophomore cohort because this cohort has high school transcripts available, which provide the most reliable measures of course-taking and grades. Most analyses include the full midlife sample of sophomores (N=8,790), but select analyses focus on the sub-sample who completed the extended survey (N=3,710). The third analytic chapter includes the senior cohort (N=6,930) and the sub-sample of sophomores who completed the extended survey, as these are the samples that were asked the question about subjective

[1] All sample size numbers have been rounded to the nearest 10 per NCES requirements.

economic insecurity (total N=10,640). I limit all samples to respondents who reported a codeable, non-military current or recent occupation on the midlife survey, resulting in an analytic sample size of about 8,040 for Chapters 3 and 4 and 9,740 for Chapter 5 (3,320 sophomores and 6,420 seniors).

Additional Datasets

Respondents' verbatim occupations on the 2014 midlife follow-up were coded using 2010 Standard Occupational Classification (SOC) codes, which I use to link respondents' occupations to occupational characteristics from external datasets. I derive measures of occupational characteristics from the 2010-14 samples of the Current Population Survey (CPS) from the Integrated Public Use Microdata Series (IPUMS) (Flood et al. 2017), the 2010 5-year sample of the American Community Survey (ACS) from the IPUMS (Ruggles et al. 2017), and version 18.0 of the Occupational Information Network (O*NET). I use age-specific CPS data from the Annual Social and Economic Supplement (ASEC), the Outgoing Rotation Group/Earner Study, and monthly samples, as appropriate. For constructing occupational measures, I limit the CPS sample to respondents aged 45-55 and use five years of data prior to and including the HS&B survey year to ensure sufficient sample sizes across occupations for reliable occupation-level means. I only use data back to 2010 to avoid peak recession years; calculations using only one, two, or three years of recent data yield consistent results.

For all occupational indicators, I constructed measures at the detailed occupation level (6-digit SOC) using appropriate sample weights for CPS and ACS. The reliability of group-averaged means used for the occupational measures is consistently high, with intra-class correlations (ICC(2)) ranging between .95 and .99. I use a multi-step matching process to link HS&B respondents' SOC codes to the occupational data to ensure the occupational measures are as accurate and detailed as possible. I first matched respondents at the detailed occupation level, and over 60% of the HS&B midlife sample matched at this level. I then aggregated measures to broader SOC levels (broad group, minor group, major group), weighting averages by the labor

share of the detailed occupations within each group, and I matched respondents at the greatest level of detail possible. This approach allowed me to match all respondents whose verbatim occupation responses could be coded, even if it was not at the detailed level. Still, over 90% of respondents matched to the detailed occupation (6-digit) or broad group (5-digit) SOC level, retaining a high level of detail in the occupational measures. The structure of the SOC is such that the 5-digit broad group often contains only one detailed occupation, or it may include multiple closely-related occupations. Figure 2.1 contains an excerpt from the SOC coding structure for illustrative purposes; for example, within the 5-digit broad group "Dentists" (29-1020), 6-digit detailed occupations include general dentists (29-1021) and orthodontists (29-1023).

Major Group	Minor Group	Broad Group	Detailed Occupation	
		27-3090		Miscellaneous Media and Communication Workers
			27-3091	Interpreters and Translators
			27-3099	Media and Communication Workers, All Other
	27-4000			**Media and Communication Equipment Workers**
		27-4010		Broadcast and Sound Engineering Technicians and Radio Operators
			27-4011	Audio and Video Equipment Technicians
			27-4012	Broadcast Technicians
			27-4013	Radio Operators
			27-4014	Sound Engineering Technicians
		27-4020		Photographers
			27-4021	Photographers
		27-4030		Television, Video, and Motion Picture Camera Operators and Editors
			27-4031	Camera Operators, Television, Video, and Motion Picture
			27-4032	Film and Video Editors
		27-4090		Miscellaneous Media and Communication Equipment Workers
			27-4099	Media and Communication Equipment Workers, All Other
29-0000				**Healthcare Practitioners and Technical Occupations**
	29-1000			**Health Diagnosing and Treating Practitioners**
		29-1010		Chiropractors
			29-1011	Chiropractors
		29-1020		Dentists
			29-1021	Dentists, General
			29-1022	Oral and Maxillofacial Surgeons
			29-1023	Orthodontists
			29-1024	Prosthodontists
			29-1029	Dentists, All Other Specialists
		29-1030		Dietitians and Nutritionists
			29-1031	Dietitians and Nutritionists
		29-1040		Optometrists
			29-1041	Optometrists

Figure 2.1. SOC Coding Structure (Bureau of Labor Statistics)

MEASURES

Academic Course-taking (Chapters 3 and 4)

I measure course-taking using the Classification of Secondary School Courses (CSSC) codes from respondents' high school transcripts. I classify math and science coursework by level of academic rigor to determine respondents' highest math and science courses. The reference category for math coursework is less than Algebra 1, and additional categories are Algebra 1, Geometry, and Algebra 2 or above. Algebra 1 is an important dividing point for studying general labor market outcomes because it introduces abstract reasoning and analysis. For science coursework, the reference category is less than biology and additional categories are biology, chemistry, or above chemistry. Previous research using HS&B has suggested that rigorous coursework for this cohort would be Algebra 2 or above in math and chemistry or above in science (Bishop 1985). Extensive coursework in English is generally required of all students, so I measure rigorous coursework by taking at least one honors English course (Gamoran 1987). Foreign language courses are considered part of an academically intense curricula and are required for many colleges (Adelman 2006); therefore, I also include number of foreign language credits.

Achievement and Skills (Chapters 3 and 4)

Previous literature indicates that higher levels of math coursework not only foster students' math skills but also more general higher-order cognitive skills that lead to greater productivity and better employment outcomes (Gaertner et al. 2014; Joensen and Nielsen 2009; Rose and Betts 2001, 2004). I include senior year math test score to account for students' math-specific skills. The math test items are a mix of questions that measure general cognitive math abilities and questions that correspond to the content of high school curriculum, covering basic arithmetic, fractions, and some algebra and geometry (Coleman, Hoffer, and Kilgore 1982; Heyns and Hilton 1982; Rock et al. 1985). The test score is scaled according to Item Response Theory (IRT) and standardized to a mean of 0 and standard deviation of 1 for the HS&B 1982

sophomore sample. By including a measure of math achievement in my models, such that math coursework may independently tap the higher-order skills fostered by the courses that are not specifically related to math content.

I include academic grade point average (GPA) as a measure of general academic achievement that is also related to students' effort, work habits, or self-regulation, which may confound the relationship between academic coursework and occupational attainment (Evans and Rosenbaum 2008; Farkas et al. 1990; Kelly 2008). I use high school transcripts to compute students' cumulative weighted core academic GPA, which includes only core academic subjects, adds an extra grade point to honors, Advanced Placement, and International Baccalaureate courses, and is measured on a 4-point scale.

Locus of Control (all chapters)

All chapters include a measure of locus of control, or the extent to which respondents feel they have control over their lives (Rotter 1966). The locus of control measure is based on a scale that is constructed from respondents' answers to a series of questions during their senior year of high school. The scaled score is standardized to a mean of 0 and standard deviation of 1 for each cohort. The variable is coded such that a lower score indicates a more external locus of control and a higher score indicates a more internal locus of control.

Independent Variables from Midlife (all chapters)

I measure bachelor's degree attainment at midlife using respondents' reports of educational attainment across waves and college transcript information. For Chapters 3 and 4, I use a categorical measure of marital status at midlife that indicates whether respondents are currently married, have never been married, or are divorced/separated/widowed; Chapter 5 uses a dichotomous measure of married/not married. Chapters 3 and 4 also include a three-category indicator of parental status at midlife, which separates parents based on whether they had

children within four years of expected high school graduation to account for early childbearing as opposed to childbearing that occurred after the normative time of college attendance.

Sociodemographic and School Controls (all chapters)

All models include a host of covariates measured when respondents were in high school, to account for known correlates of academic preparation, skills, and economic outcomes. Individual-level controls include respondents' race or ethnicity (non-Hispanic white, Black, Hispanic, and other race/ethnicity), family structure (lives with both biological parents), family income, and parent education (highest between mother and father). School-level controls include high school sector (private vs. public), urbanicity (suburban, urban, rural), and a dummy for South census region.

GENERAL ANALYTIC STRATEGY

Because outcome variables differ across chapters, I discuss specific modeling strategies within each individual analytic chapter. To examine processes within and across groups with similar opportunity structures, all models are stratified by gender, educational attainment, or both. In most analyses, I use nested modeling to account for mediating pathways between adolescent characteristics and midlife outcomes. Because log odds and odds ratios cannot be accurately compared across models or subsamples, I report the average marginal effects (AMEs) for any analyses using logistic regression (Mood 2010). The AME can be interpreted as the percentage point change in the average predicted probability of the outcome that corresponds to a one-unit change in the predictor.

All analyses use appropriate probability weights to account for the sampling design of HS&B and attrition across waves. I use multiple imputation with chained equations to account for missing data on independent variables (m=20). However, I do not impute the outcome variables from Chapters 3 and 4 when they are used as independent variables in analyses for Chapter 5.

Chapter 3: Skills in Adolescence and Long-Run Labor Force Attachment

Being out of the labor force as early as age 50 represents a significant disadvantage for most individuals, especially when people are living and working longer than ever before (Mermin et al. 2007; Virick 2011). Work during the preretirement years is a vital component of long-term wellbeing, especially with life expectancy increasing and the burden of saving for retirement shifting heavily toward workers. At midlife, people are accumulating the majority of their retirement savings and are more susceptible to the economic and psychological effects of job loss (Gallo et al. 2000; Mitchell and Moore 1998; Virick 2011). Employment experiences at midlife set the stage for the quality of transitions into old age and retirement. Middle-aged individuals without a strong attachment to the workforce face a future of economic vulnerability, and the stakes at this point in the life course are especially high.

Though researchers have often focused on contemporaneous correlates of employment status, such studies ignore the potential importance of the skills that individuals develop earlier in life that prepare them for work across the life course. The skills that individuals possess in high school help shape their educational and occupational pathways, and these skills may differentially enable them to manage and adapt to their circumstances in the future. It is well established that workers' pre-labor market skills and education play an important role in determining the kinds of jobs they get. These skills may also help people get promoted, learn on the job, and even manage and adapt to workforce challenges, all of which can promote stronger labor force attachment.

People may not be employed for a number of reasons, but the emergence of health conditions may make it particularly difficult for some individuals to maintain an attachment to the labor force as they age (Burr et al. 1996; Hayward et al. 1989; Jenkins 1991). This is a cohort that has begun to encounter these health conditions at midlife, after having experienced vast technological transformation in the workforce and the Great Recession. Their pre-labor market skills may have helped determine who was well-equipped and positioned to endure these

challenges. In considering the types of skills that may promote employment, I focus on individuals' math-related skills and locus of control in high school. Having better math-related skills may enable people to maintain an attachment to the workforce as occupational skill demands have increasingly concentrated on analytic and STEM-related skills, especially for the best jobs. Better math-related skills and a greater sense of personal control could contribute to more favorable employment experiences, better health management, or greater ability to adapt in the face of adversity. By concentrating on individuals' skills at the end of high school, I can better understand the early determinants of barriers to work during the crucial pre-retirement years.

Understanding how individuals' skills at the end of high school shape their labor force experiences at midlife can shed light on the processes through which the skills students carry into adulthood matter for health and labor market outcomes in later life. While individuals' experiences and characteristics later in life undoubtedly shape their labor force participation, it is important to focus on the earlier skills and mindsets that have shaped these pathways and imbued individuals with the means necessary to maintain an attachment to the labor force. After all, adolescents do not transition to adults as blank slates; they carry skills with them that lead to different decision-making processes and behaviors across the life course that can have very real consequences in their adult lives. This research can enrich our knowledge of how skills in adolescence might be placing individuals on early trajectories of health and labor force participation. This chapter's results point to the importance of individuals' pre-labor market skills in helping them maintain an attachment to the labor force later in life and adapt to challenging circumstances that may threaten their livelihood and wellbeing.

BACKGROUND

Working at Midlife

A job is more than just a source of income; it is a fundamental social role and source of identity (Brand 2015; Lachman 2004). Having a career and stable employment have been

repeatedly espoused as critical sources of social integration (Durkheim 2014; Wilensky 1961; Wilson and Musick 1997). Given the societal importance of work, employment status is a powerful signal of social status for people of working age (Young 2012). Individuals who are employed experience significantly slower declines in perceived health and physical functioning compared to the non-employed, even after adjusting for differences in economic wellbeing (Ross and Mirowsky 1995).

Work is particularly important at midlife, when individuals may experience their peak in occupational position and earnings (Lachman 2004; Mendenhall et al. 2008) and also may bear financial and time burdens of caring for their children and aging parents. Separation from the workforce in the pre-retirement years can have severe financial consequences because that is the period in which people accumulate most of the wealth that will finance their retirements (Mitchell and Moore 1998). This is especially important considering that people are now working longer than they did twenty years ago due to declines in pensions and retiree health benefits, as well as increased concerns about the ability to afford retirement in the face of increased life expectancy (Mermin et al. 2007; O'Rand 2011; Virick 2011). In addition, changes to Social Security since the 1980s have led to increases in labor force participation among older workers because working longer is incentivized for eligibility to obtain full benefits (Blau and Goodstein 2010; O'Rand 2011). Considering the financial, social, and health benefits of employment, people who are not working at midlife face significant adversity.

As people age, their health plays an increasingly important role in their ability to remain in the workforce. An individual exits the workforce due to disability when they have a health limitation that prevents them from being able to work; thus, the disability depends both on their health status and their working conditions (Crimmins, Reynolds, and Saito 1999; Jenkins 1991; Nagi 1965; Verbrugge and Jette 1994). Because work disability depends on the relationship between a person's abilities and their work environment, it may be avoided by either improving someone's capabilities or by reducing the demands of their work environment (Brandt et al. 2011; Crimmins et al. 1999; Nagi 1965; Verbrugge and Jette 1994). Previous research suggests

that midlife is a time when the socioeconomic gradient in disability may be the strongest (House et al. 1994), so it is a time when skills may play a particularly important role in the ability to hold a job.

Higher-skilled workers may be able to avoid disability through preventative health practices or adapt to limiting conditions by changing to a different job; whereas, lower-skilled workers may have less access to health care and fewer occupational options due to a lack of qualifications for higher-paying and less physically-demanding jobs (Hayward et al. 1989). Further, the unemployed face lower opportunity costs of exiting the labor force due to disability; thus low-skilled and low-wage workers who could qualify for disability benefits may be induced to exit the labor force when faced with the prospect of prolonged unemployment (Autor and Duggan 2003). Regardless of the circumstances that precipitate it, exiting the workforce due to disability can lead not only to economic hardship but also to professional and social marginalization (Jenkins 1991; O'Brien 2013). Unable to work, people who exit the labor force due to disability are detached from one of the most economically and socially important institutions of modern life.

Unemployment is generally a more transient separation from work than disability, but the negative economic effects of unemployment may last for years even after re-employment (Young 2012). When the unemployed eventually find new jobs, these new jobs generally pay lower wages and have poorer working conditions (Brand 2006; Fuller 2008; Gangl 2006; Roscigno et al. 2007). Beyond financial losses, being unemployed decreases one's health over time relative to being employed (Ross and Mirowsky 1995). Older workers may be more vulnerable to physical and mental health consequences of job loss (Gallo et al. 2000). They are less able to psychologically, financially, and socially deal with job loss than their younger counterparts (Virick 2011). Further, at midlife, workers face a particular risk of unemployment and barrier to reemployment due to age discrimination (Burr et al. 1996; Lassus 2015; Mendenhall et al. 2008; O'Rand 2011; Roscigno et al. 2007). Employers may value younger and less senior workers because they can pay them less and perceive them as having more updated

skills (Lassus 2015; Mendenhall et al. 2008; Roscigno et al. 2007; Virick 2011). A study by Roscigno and colleagues (2007) found that workers nearing 50 years old and those close to retirement are the most vulnerable to age discrimination in employment and that the discrimination is most likely to entail termination from the workplace. Thus, age discrimination may serve as the source of unemployment, a barrier to re-employment, or both.

When people are still of working age, even voluntary separations from employment such as homemaking or early retirement place individuals at economic risk. Many people who retire early have to eventually re-enter the workforce to maintain household income due to insufficient retirement funds (O'Rand 2011). Homemakers are often dependent on the income stream of a partner or spouse, which not only limits their financial independence but also concentrates the household's risk of economic loss on one earner. As with the unemployed, retirees and homemakers looking to (re-)enter the labor force would undoubtedly face obstacles due to age discrimination and skill obsolescence. These obstacles may be even more difficult for individuals who have experienced a lengthy absence from the labor force. Further, Ross and Mirowsky (Ross and Mirowsky 1995) found that the detrimental health effects of retirement or homemaking were as bad as or worse than the effects associated with unemployment. Though retirement may be seen as a more voluntary exit than work disability, some retirements follow periods of protracted illness or disability or are due to worker discouragement, leaving retirees financially unprepared and/or in poor health (Burr et al. 1996; Hayward et al. 1989; O'Rand 2011).

Educational Attainment and Occupational Characteristics

Skills play a role in sorting individuals into higher education and occupations that influence their labor force participation and position them for maintaining health over the life course (Cutler and Lleras-Muney 2010; McDonough and Amick 2001; Yelin et al. 1980). In general, people with higher cognitive and non-cognitive skills complete more education (Lleras 2008), enter better occupations, and enjoy higher earnings (Cawley et al. 2001; Conti et al. 2010;

Farkas 2003; Hall and Farkas 2011; Kerckhoff et al. 2001). Further, previous research has found that higher cognitive skills translate into higher status occupations and higher earnings, irrespective of people's educational attainment (Kerckhoff et al. 2001). Because many of today's best-paying and least physically-demanding jobs involve technology or analytic tasks, better skills may enable individuals to obtain these desirable jobs either directly or through higher education (Rose and Betts 2001).

Considering that people with better skills are more likely to complete higher education (Adelman 2006; Aughinbaugh 2012; Joensen and Nielsen 2009; Karlson 2015; Lleras 2008), part of the relationship between skills in adolescence and employment status at midlife may operate through educational attainment. A bachelor's degree gives people access to better jobs, but educational attainment may also be related to employment status due to its association with workers' health. It is well established that more education leads to better health (Freedman and Martin 1999; Lynch 2006; Ross and Wu 1995; Walsemann, Geronimus, and Gee 2008), and better health may allow individuals to maintain a stronger and longer attachment to the workforce. People with more education engage in healthier behaviors, have stronger social relationships and support, and experience less personal and financial stress (House et al. 1994). In addition, a recent study found that people's education alone predicted better health behaviors at midlife, even independent of early-life cognitive selection into education (Clouston et al. 2015). Considering the link between pre-labor market skills, educational attainment, and midlife employment, I explore educational attainment as a possible mechanism in the link between skills in adolescence and midlife employment status.

Occupational characteristics are likewise inherently tied to labor force attachment, as people with less physical jobs may be able to work longer, especially in the face of declining health as they age (Burr et al. 1996; Hayward et al. 1989; Jenkins 1991). The physical characteristics of work are particularly important in determining labor force exit due to disability (McDonough and Amick 2001; Yelin et al. 1980). In addition, people with higher-paying occupations may be more likely to be working at midlife, as they may be motivated to maintain

longer attachment to the labor force because the opportunity costs of workforce exit are higher (Autor and Duggan 2003; Burr et al. 1996). To account for the importance of occupational characteristics, I investigate whether the relationship between people's pre-labor market skills and their midlife employment status may operate, in part, through the physical demands and wages associated with their occupations.

Skills in Adolescence

Math skills may play an important role in determining who has access to the types of jobs in later life that may foster employment, especially considering the skill demands of higher-paying and less physically-demanding jobs (Rose and Betts 2001). Math-related skills may especially benefit older workers, who are more vulnerable to skill obsolescence and less likely to be retrained. Accordingly, individuals with skills that employers need may be in a better position to avoid unemployment during economic downturns. In particular, people with better math skills may possess the types of skills that promote learning and adaptability in the face of changing occupational demands later in life.

Likewise, math skills in adolescence may protect against health-related workforce exits later in life. Previous research shows that individuals with higher cognitive skills enjoy better health (Conti et al. 2010) and are less likely to have a health limitation (Auld and Sidhu 2005). People with better math skills may hold better jobs in early adulthood and therefore develop fewer health conditions because of favorable working conditions and greater financial resources, or they may be well-situated to adapt in the face of potentially disabling conditions and remain in the workforce at midlife. Though I cannot completely ascertain if math skills behave in this manner, I investigate whether part of their relationship to people's employment status at midlife operates through the physical demands and wages of their jobs both in early adulthood and at midlife.

Considering that the majority of people are still working at midlife, people's math coursework may be related to their employment in a few different ways. The relationship may

simply be linear, with each higher math course increasing a person's odds of working. However, I may instead see a cutoff where only math courses above a certain level increase a person's odds of working. This cutoff may be Algebra 2 if the relationship between math courses and employment status largely operates through educational attainment, as taking Algebra 2 or higher is a good indicator of college preparedness (Adelman 2006). On the other hand, in light of the polarizing labor market, it may be that the very lowest levels of math relegate people to the worst jobs and constrain their opportunities to pursue higher education or obtain higher-skill jobs. A low math cut-off would be in line with previous research on course-taking that found the largest gap in the probability of graduating high school between students who took no rigorous courses and students who took just one rigorous course (Long, Conger, and Iatarola 2012).

Along with math-related skills, a greater sense of personal control in adolescence may be protective of working at midlife due to the attendant health- and work-related advantages and a greater ability to adapt in the face of adversity. A person's locus of control indicates the extent to which a person feels they have control over what happens to them in their lives. Research shows that people with an internal locus of control engage in positive health behaviors such as seeking health information, taking medication, making and keeping physician appointments, maintaining a diet, and giving up smoking (Strudler Wallston and Wallston 1978). People with an internal locus of control also experience better mental well-being, life satisfaction, and self-reported physical health (Ng, Sorensen, and Eby 2006), and they experience slower rates of decline in physical function over time (Kempen et al. 2006; Milaneschi et al. 2010). If people with an internal locus of control in adolescence engage in healthier behaviors over the course of their lives, they may be less likely to be out of the workforce due to disability at midlife because they may be in better health or able to manage any health conditions more effectively.

In addition, people with an internal locus of control enjoy a host of work-related advantages such as greater autonomy, variety, and challenge in their work tasks and higher job satisfaction, commitment, and motivation (Ng et al. 2006). Further, individuals with an internal locus of control feel more self-efficacious and empowered (Ng et al. 2006); they take a more

active role in their career management and have more positive career experiences, including more promotions (Hammer and Vardi 1981). These work-related advantages may lead people with an internal locus of control to develop a stronger attachment to the labor force, as they may have better jobs or job performance than people with a more external locus of control. In addition, a feeling of control over their lives may enable individuals to adapt in the face of adverse employment circumstances such as potentially disabling health conditions or job loss (Clarke and Smith 2011), and they may be better situated to continue working by seeking out workplace accommodations or re-employment.

METHODS

Dependent Variable

Employment Status at Midlife. The dependent variable is a categorical measure that indicates a respondent's self-reported employment status as of the Fifth Follow-Up in 2014 (0=currently working, 1=exited labor force due to disability, 2=unemployed, 3=retired/homemaker). Due to small cell sizes, I collapse response categories, but I do so in such a way that labor force attachment is reflected in the groupings. I combine "unemployed" and "temporarily laid off, on sick or other leave" into one category to represent persons still in the labor force but not currently working; in addition, I combine retired and homemaker into one category to reflect persons who may be considered as having voluntarily exited the labor force. I count respondents as missing if they indicated an employment status of "other," which removes about 90 people from my sample.

Occupational Characteristics

Physical Demands and Average Wage of Occupation at Midlife. I construct a variable for logged average occupational wages using 2013 Bureau of Labor Statistics data. I used O*NET to construct measures of the physical demands of respondents' occupations. The physical demands measure is based on a scale that is constructed from O*NET items that provide

information on the physical components of occupations. The scale is derived from a combination of two constructs, "physical tasks" and "repetitive physical tasks", used by Autor and Handel (2009) to capture the physical demands of a job. Table A1 details the O*NET items used in constructing the scale and provides the Cronbach's alpha for the scale. The scale is standardized to a mean of 0 and standard deviation of 1 for the entire O*NET version 18.0 occupational database.

ANALYTIC PLAN

I employ multinomial logistic regression to predict employment status at approximately age 50. Coefficients are reported as average marginal effects (AME), which are unsusceptible to changes in unobserved heterogeneity across logistic regression models (Mood 2010). I employ nested models to assess the extent to which educational attainment, midlife occupational characteristics, and other midlife characteristics attenuate the associations between skills in adolescence and employment status at midlife. Models are stratified by gender to account for gendered labor market processes.

Even with collapsing categories, only 5-7% of my sample falls into each of the three non-working employment statuses. Disability, in particular, is incredibly rare among people with a college degree, which limited my ability to stratify models by educational attainment as I do in following chapters. However, simplified versions of my models indicate no significant differences by educational attainment in the relationships between my main variables of interest and employment status. I also conducted ancillary analyses including other course-taking measures in the models, but multicollinearity led to inflated standard errors on the math and GPA measures. Including other subjects provided almost no additional explanatory power and did not change the coefficients of the math course-taking measures. Combined with my theoretical motivations for focusing on math-related skills, these issues led me to exclude other subjects for model parsimony.

RESULTS

Table 3.1 presents weighted descriptive statistics for all variables in the analytic sample, by employment status. On average, people who are working at midlife have higher math skills, higher grades, a more internal locus of control, and take higher levels of math compared to people who are unemployed or out of the labor force due to disability. About 37% of working individuals have a college degree, compared to 10% of people out of the labor force due to disability. People who report that they are disabled had more physically demanding occupations and lower wages compared to people who are still working. They also exhibit different family formation patterns, having children earlier and being less likely to be currently married. Over 80% of people who report being retired or a homemaker are women, and people in this category look similar to people who are currently working. This reflects the relatively advantaged status of people who "voluntarily" exit the workforce; almost 90% are married, implying they are likely to have a working spouse.

Table 3.1: Weighted Means and Proportions, by Employment Status

	Full	Working	Disabled	Unemp	Ret/Home
N=8,040		.82	.07	.05	.05
Female	0.51	0.49	0.51	0.50	0.82
Highest math course					
<Algebra 1	0.34	.31	.62	.49	.37
Algebra 1	0.18	.18	.18	.15	.18
Geometry	0.13	.13	.06	.09	.13
Algebra 2 or above	0.36	.38	.14	.27	.32
Locus of control (std)	0 (.99)	.04 (.98)	-.48 (1.00)	-.13 (.98)	.10 (.98)
Weighted core academic GPA	2.31	2.35 (.74)	1.89 (.54)	2.09 (.62)	2.41 (.72)
Math test score	0 (.98)	.09 (.98)	-.64 (.71)	-.35 (.92)	-.06 (1.00)
College degree	0.34	0.37	0.10	0.25	0.35
Physical demands of occupation	-.19 (.73)	-0.24 (.72)	0.25 (.72)	-0.01 (.77)	-0.27 (.65)
Logged occupational wages	3.20 (.55)	3.25 (.55)	2.92 (.41)	3.05 (.48)	3.05 (.59)
Marital status					
Married	0.65	.67	.44	.46	.86
Separated/Divorced/Widowed	0.21	.20	.34	.30	.10
Never married	0.14	.13	.21	.24	.04
Parental status					
Parent after 1986	0.61	.63	.39	.48	.64
Early parent	0.20	.18	.40	.23	.25
No children	0.19	.18	.22	.29	.11
Race/ethnicity					
Non-Hispanic white	0.73	.74	.57	.62	.75
Black	0.12	.11	.24	.18	.06
Hispanic	0.12	.11	.17	.16	.13
Other race/ethnicity	0.04	.03	.03	.05	.06
Parent has college degree					
Family income	21391.00 (12299)	21735.00 (12386)	17587.00 (11090)	20977.00 (11396)	21420.00 (12339)
Lived with both parents	0.71	.72	.70	.64	.73
School urbanicity					
Urban	0.21	.20	.30	.29	.23
Suburban	0.48	.49	.40	.49	.44
Rural	0.31	.31	.30	.22	.33
South region	0.31	.30	.37	.32	.33
Private school	0.10	.10	.04	.08	.11
Disability in high school	0.09	.09	.15	.11	.10

Table 3.2 presents average marginal effects (AMEs) from multinomial logistic regressions predicting women's employment statuses in 2014. Model 1 presents the relationship between skills in adolescence and employment status at midlife, net of sociodemographic background and school controls. Independent of math achievement and grades, advancing to Algebra 1 or Geometry sizably increases women's probability of working and lowers their chances of disability. This implies that, regardless of achievement and math abilities, taking intermediate math courses increases women's chances of working and decreases their chances of disability at midlife, relative to taking only lower-level math courses. Higher math test scores slightly increase women's chances of working, and higher grades increase their chances of working and also guard against disability and unemployment. The analyses show no significant effect of taking the highest levels of math, but ancillary analyses show that the achievement measures account for the role of Algebra 2 or above. Thus, any effect of Algebra 2 for women on their employment may be due to selection into the highest courses, which poses less of an issue at intermediate levels of math. Finally, a more internal locus of control provides some protection against disability even net of disabling conditions in high school, which is consistent with previous literature showing the importance of attitudinal and psychosocial factors in shaping disability. Though the magnitude of some of these relationships may appear small, only about 7% of the weighted sample is out of the workforce due to disability and 5% unemployed at midlife, so a decrease in probability of disability of over 4 percentage points is incredibly large. Model 2 shows that these patterns persist even after controlling for college degree attainment, and a college degree only exhibits a significant relationship to disability.

Table 3.2. Average Marginal Effects from Multinomial Logistic Regressions Predicting Employment Status at Midlife for Women

	Model 1				Model 2			
N=4,270	Working	Disabled	Unemp	Ret/Home	Working	Disabled	Unemp	Ret/Home
Highest math course (ref: <Alg1)								
Algebra 1	0.072**	-0.046***	-0.020	-0.006	0.072**	-0.045***	-0.021	-0.006
	(0.026)	(0.013)	(0.015)	(0.020)	(0.026)	(0.013)	(0.015)	(0.020)
Geometry	0.084**	-0.045**	-0.030*	-0.009	0.083**	-0.043**	-0.031*	-0.009
	(0.029)	(0.014)	(0.014)	(0.025)	(0.029)	(0.014)	(0.014)	(0.025)
Algebra 2 or above	0.038	-0.024	0.006	-0.019	0.035	-0.019	0.005	-0.021
	(0.029)	(0.018)	(0.017)	(0.020)	(0.029)	(0.018)	(0.017)	(0.020)
Locus of control (std)	0.006	-0.014*	0.008	-0.000	0.006	-0.013*	0.008	-0.001
	(0.009)	(0.005)	(0.005)	(0.007)	(0.009)	(0.005)	(0.005)	(0.007)
Weighted core academic GPA	0.046**	-0.029*	-0.028**	0.010	0.045**	-0.026*	-0.029**	0.010
	(0.017)	(0.012)	(0.011)	(0.008)	(0.017)	(0.012)	(0.011)	(0.008)
Math test score	0.034*	-0.014	-0.016	-0.004	0.032*	-0.009	-0.017	-0.006
	(0.014)	(0.009)	(0.010)	(0.009)	(0.015)	(0.010)	(0.011)	(0.009)
College degree					0.024	-0.043*	0.008	0.011
					(0.025)	(0.020)	(0.014)	(0.014)
Race/ethnicity (ref: non-Hispanic white)								
Black	0.061	0.023	0.001	-0.085**	0.060	0.025	0.001	-0.086**
	(0.032)	(0.017)	(0.017)	(0.027)	(0.032)	(0.017)	(0.017)	(0.027)
Hispanic	0.033	-0.007	-0.007	-0.020	0.033	-0.007	-0.007	-0.019
	(0.027)	(0.015)	(0.016)	(0.019)	(0.027)	(0.015)	(0.016)	(0.019)
Other race/ethnicity	-0.008	-0.041	0.025	0.024	-0.008	-0.040	0.025	0.023
	(0.051)	(0.029)	(0.020)	(0.036)	(0.051)	(0.029)	(0.020)	(0.036)
Parent has college degree	0.010	-0.007	0.009	-0.012	0.009	-0.006	0.009	-0.012
	(0.020)	(0.013)	(0.012)	(0.013)	(0.020)	(0.013)	(0.012)	(0.013)

Table 3.2, *continued*	Model 1				Model 2			
	Working	Disabled	Unemp	Ret/Home	Working	Disabled	Unemp	Ret/Home
Family income	-0.000	-0.000	0.000	0.000	-0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Lived with both parents	-0.010	0.005	0.004	0.001	-0.010	0.005	0.004	0.001
	(0.020)	(0.013)	(0.011)	(0.015)	(0.020)	(0.013)	(0.011)	(0.015)
School urbanicity (ref: urban)								
Suburban	0.017	0.001	-0.011	-0.007	0.017	0.000	-0.011	-0.007
	(0.022)	(0.014)	(0.016)	(0.016)	(0.022)	(0.015)	(0.016)	(0.016)
Rural	0.019	0.005	-0.026	0.002	0.019	0.004	-0.026	0.002
	(0.024)	(0.015)	(0.017)	(0.018)	(0.024)	(0.015)	(0.017)	(0.018)
South region	-0.014	0.014	-0.008	0.008	-0.014	0.014	-0.008	0.008
	(0.019)	(0.012)	(0.012)	(0.014)	(0.019)	(0.012)	(0.012)	(0.014)
Private school	0.010	-0.019	-0.014	0.023	0.007	-0.015	-0.015	0.022
	(0.023)	(0.018)	(0.013)	(0.012)	(0.023)	(0.018)	(0.013)	(0.012)
Disability in high school	-0.037	0.032	-0.005	0.010	-0.037	0.032	-0.005	0.010
	(0.034)	(0.018)	(0.020)	(0.026)	(0.034)	(0.018)	(0.020)	(0.025)

*** p<0.001, ** p<0.01, * p<0.05
(Standard errors in parentheses)

Table 3.2, *continued*	Model 3				Model 4			
	Working	Disabled	Unemp	Ret/Home	Working	Disabled	Unemp	Ret/Home
Highest math course (ref: <Alg1)								
Algebra 1	0.070**	-0.047**	-0.020	-0.004	0.066*	-0.042**	-0.023	-0.001
	(0.026)	(0.015)	(0.015)	(0.019)	(0.026)	(0.014)	(0.015)	(0.019)
Geometry	0.075*	-0.041*	-0.029*	-0.005	0.075**	-0.037*	-0.031*	-0.007
	(0.030)	(0.017)	(0.014)	(0.024)	(0.029)	(0.015)	(0.015)	(0.023)
Algebra 2 or above	0.028	-0.017	0.006	-0.016	0.025	-0.013	0.004	-0.017
	(0.029)	(0.020)	(0.017)	(0.020)	(0.029)	(0.018)	(0.017)	(0.020)
Locus of control (std)	0.002	-0.011	0.009	-0.000	0.004	-0.010	0.008	-0.002
	(0.009)	(0.006)	(0.005)	(0.006)	(0.009)	(0.006)	(0.005)	(0.007)
Weighted core academic GPA	0.047**	-0.029*	-0.028**	0.010	0.047**	-0.024	-0.028*	0.005
	(0.017)	(0.013)	(0.011)	(0.008)	(0.017)	(0.013)	(0.011)	(0.008)
Math test score	0.026	-0.008	-0.016	-0.002	0.024	-0.006	-0.013	-0.005
	(0.015)	(0.011)	(0.010)	(0.009)	(0.014)	(0.010)	(0.010)	(0.009)
College degree	0.008	-0.039	0.011	0.020	0.010	-0.034	0.006	0.018
	(0.026)	(0.023)	(0.016)	(0.014)	(0.026)	(0.021)	(0.016)	(0.014)
Physical demands of occupation	-0.041*	0.036**	0.003	0.001	-0.039*	0.031**	0.003	0.005
	(0.017)	(0.012)	(0.010)	(0.010)	(0.017)	(0.011)	(0.010)	(0.010)
Logged occupational wages	0.038*	0.006	-0.008	-0.036***	0.038*	0.003	-0.008	-0.034***
	(0.017)	(0.012)	(0.010)	(0.010)	(0.017)	(0.011)	(0.010)	(0.009)
Marital status (ref: married)								
Separated/Divorced/Widowed					0.041	0.027	0.022	-0.090***
					(0.022)	(0.016)	(0.015)	(0.011)
Never married					0.070**	0.004	0.011	-0.085***
					(0.026)	(0.017)	(0.016)	(0.017)
Parental status (ref: parent after 1986)								
Early parent					-0.016	0.036*	-0.001	-0.019
					(0.022)	(0.015)	(0.012)	(0.014)
No children					-0.053	0.048*	0.035	-0.030
					(0.031)	(0.019)	(0.022)	(0.021)

Table 3.2, *continued*	Model 3				Model 4			
	Working	Disabled	Unemp	Ret/Home	Working	Disabled	Unemp	Ret/Home
Race/ethnicity (ref: non-Hispanic white)								
Black	0.056	0.026	0.001	-0.082**	0.043	0.021	-0.001	-0.063*
	(0.032)	(0.018)	(0.017)	(0.025)	(0.032)	(0.018)	(0.017)	(0.025)
Hispanic	0.028	-0.005	-0.006	-0.018	0.019	-0.006	-0.007	-0.006
	(0.026)	(0.017)	(0.016)	(0.018)	(0.027)	(0.015)	(0.016)	(0.018)
Other race/ethnicity	-0.019	-0.036	0.027	0.028	-0.026	-0.041	0.025	0.042
	(0.050)	(0.031)	(0.020)	(0.034)	(0.048)	(0.031)	(0.019)	(0.032)
Parent has college degree	0.003	-0.002	0.010	-0.010	0.002	-0.004	0.009	-0.007
	(0.020)	(0.014)	(0.012)	(0.012)	(0.020)	(0.014)	(0.012)	(0.012)
Family income	-0.000	-0.000	0.000	0.000	-0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Lived with both parents	-0.011	0.006	0.004	0.001	-0.008	0.007	0.005	-0.004
	(0.020)	(0.014)	(0.011)	(0.014)	(0.020)	(0.013)	(0.011)	(0.014)
School urbanicity (ref: urban)								
Suburban	0.014	0.001	-0.010	-0.005	0.017	-0.001	-0.011	-0.005
	(0.023)	(0.016)	(0.015)	(0.015)	(0.023)	(0.015)	(0.015)	(0.016)
Rural	0.020	0.004	-0.025	0.002	0.024	0.004	-0.025	-0.003
	(0.024)	(0.017)	(0.017)	(0.017)	(0.025)	(0.016)	(0.017)	(0.017)
South region	-0.014	0.015	-0.008	0.007	-0.015	0.014	-0.006	0.007
	(0.019)	(0.013)	(0.012)	(0.013)	(0.019)	(0.012)	(0.012)	(0.013)
Private school	0.009	-0.015	-0.014	0.021	0.013	-0.013	-0.018	0.018
	(0.024)	(0.020)	(0.013)	(0.012)	(0.024)	(0.019)	(0.014)	(0.012)
Disability in high school	-0.036	0.036	-0.006	0.007	-0.034	0.033	-0.007	0.008
	(0.034)	(0.021)	(0.020)	(0.024)	(0.034)	(0.019)	(0.020)	(0.023)

*** p<0.001, ** p<0.01, * p<0.05
(Standard errors in parentheses)

The last two models add midlife occupational and family formation measures. Though a college degree did not mediate the association with early skills, it may be that heterogeneity in employment experiences or marital status matter more for women's employment. In Model 3, both occupational measures show a significant relationship to employment for women, but they do not attenuate the coefficients for math course-taking or GPA. As expected, greater physical demands decrease chances of working and increase women's likelihood of disability. Higher wages promote employment, but they especially protect against "voluntary" labor force exits for women. Finally, Model 4 suggests that married women are more likely to voluntarily exit the labor force, even net of other characteristics, and unmarried women are more likely to be working. Early childbearing or having no children both have similar relationships to women's employment, increasing their risk of disability. This may point to economic considerations in exiting the labor force, as women with adult children or without children may have fewer financial burdens and lower opportunity costs. Even in the final model, the main relationships between early skills and later employment status persist for women, suggesting that the relationship is not due to advantages on key socioeconomic factors such as education, occupation, or marital status later in life.

Table 3.3 presents similar models for men. In Model 1, both math-related skills measures significantly predict employment status for men. Higher math achievement and higher levels of math increase men's likelihood of working and decrease their likelihood of disability. Whereas women benefited from intermediate-level math, independent of achievement measures, it is the highest levels of math that support employment for men. This may be because GPA is less correlated with course-taking for men since men have lower GPAs, or it may be due to women's "positive" selection driving voluntary labor force exits compared to men. The former explanation is consistent with the effect of math test scores for men instead of GPA; GPA for women and math test scores for men may be tapping similar academic competencies net of math course-taking because of gendered achievement patterns. Unlike the models for women, a college degree is significantly associated with higher chances of working for men, and it explains a portion of the effects for math test scores and advanced math courses. The difference in the impact of a college degree is consistent with more advantaged women exiting the labor force.

Table 3.3. Average Marginal Effects from Multinomial Logistic Regressions Predicting Employment Status at Midlife for Men

	Model 1				Model 2			
N=3,680	Working	Disabled	Unemp	Ret/Home	Working	Disabled	Unemp	Ret/Home
Highest math course (ref: <Alg1)								
Algebra 1	0.028	-0.001	-0.025	-0.002	0.027	-0.001	-0.024	-0.002
	(0.028)	(0.022)	(0.017)	(0.012)	(0.028)	(0.021)	(0.017)	(0.011)
Geometry	0.065*	-0.033	-0.015	-0.017	0.063*	-0.032	-0.014	-0.016
	(0.032)	(0.020)	(0.025)	(0.010)	(0.031)	(0.020)	(0.025)	(0.010)
Algebra 2 or above	0.069**	-0.041*	-0.023	-0.006	0.059*	-0.036*	-0.020	-0.004
	(0.025)	(0.017)	(0.019)	(0.012)	(0.025)	(0.016)	(0.019)	(0.012)
Locus of control (std)	-0.001	-0.004	-0.004	0.008	-0.003	-0.003	-0.003	0.009
	(0.009)	(0.006)	(0.006)	(0.005)	(0.009)	(0.006)	(0.006)	(0.005)
Weighted core academic GPA	0.013	-0.024*	0.008	0.003	0.004	-0.020*	0.011	0.005
	(0.014)	(0.010)	(0.010)	(0.006)	(0.015)	(0.010)	(0.010)	(0.006)
Math test score	0.044**	-0.024*	-0.014	-0.006	0.035*	-0.020	-0.011	-0.004
	(0.014)	(0.011)	(0.009)	(0.005)	(0.014)	(0.011)	(0.009)	(0.004)
College degree					0.082**	-0.046	-0.021	-0.016
					(0.030)	(0.026)	(0.019)	(0.009)
Race/ethnicity (ref: non-Hispanic white)								
Black	-0.051*	0.033	0.022	-0.005	-0.059*	0.037*	0.025	-0.003
	(0.026)	(0.017)	(0.019)	(0.011)	(0.026)	(0.017)	(0.019)	(0.011)
Hispanic	-0.039	0.006	0.027	0.006	-0.042	0.007	0.028	0.007
	(0.023)	(0.016)	(0.017)	(0.009)	(0.023)	(0.016)	(0.017)	(0.009)
Other race/ethnicity	-0.016	-0.016	0.009	0.022	-0.016	-0.016	0.010	0.022
	(0.036)	(0.029)	(0.020)	(0.015)	(0.036)	(0.029)	(0.020)	(0.014)
Parent has college degree	-0.011	0.002	-0.005	0.014	-0.010	0.002	-0.005	0.013
	(0.019)	(0.015)	(0.013)	(0.009)	(0.019)	(0.014)	(0.013)	(0.008)

Table 3.3, *continued*

	Model 1				Model 2			
	Working	Disabled	Unemp	Ret/Home	Working	Disabled	Unemp	Ret/Home
Family income	0.000	-0.000	0.000	-0.000	0.000	-0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Lived with both parents	-0.018	0.015	-0.003	0.006	-0.016	0.014	-0.004	0.006
	(0.021)	(0.016)	(0.014)	(0.009)	(0.021)	(0.016)	(0.014)	(0.008)
School urbanicity (ref: urban)								
Suburban	0.048	-0.016	-0.008	-0.024*	0.045	-0.015	-0.007	-0.023*
	(0.025)	(0.016)	(0.019)	(0.012)	(0.024)	(0.015)	(0.019)	(0.011)
Rural	0.066**	-0.015	-0.037*	-0.013	0.065**	-0.015	-0.037*	-0.013
	(0.025)	(0.017)	(0.017)	(0.012)	(0.024)	(0.016)	(0.016)	(0.012)
South region	-0.004	-0.008	0.002	0.010	-0.004	-0.007	0.002	0.010
	(0.020)	(0.014)	(0.014)	(0.009)	(0.020)	(0.014)	(0.014)	(0.009)
Private school	-0.003	-0.006	0.020	-0.012	-0.011	-0.001	0.023	-0.010
	(0.028)	(0.021)	(0.015)	(0.010)	(0.028)	(0.022)	(0.015)	(0.010)
Disability in high school	-0.031	0.015	0.006	0.010	-0.033	0.016	0.007	0.010
	(0.026)	(0.017)	(0.015)	(0.015)	(0.026)	(0.017)	(0.015)	(0.015)

*** p<0.001, ** p<0.01, * p<0.05
(Standard errors in parentheses)

Table 3.3, *continued*	Model 3				Model 4			
	Working	Disabled	Unemp	Ret/Home	Working	Disabled	Unemp	Ret/Home
Highest math course (ref: <Alg1)								
Algebra 1	0.028	-0.000	-0.025	-0.003	0.025	0.003	-0.024	-0.003
	(0.028)	(0.021)	(0.017)	(0.011)	(0.028)	(0.022)	(0.016)	(0.012)
Geometry	0.063	-0.030	-0.014	-0.018	0.061	-0.029	-0.014	-0.018
	(0.032)	(0.020)	(0.026)	(0.011)	(0.031)	(0.020)	(0.025)	(0.011)
Algebra 2 or above	0.058*	-0.034*	-0.019	-0.004	0.055*	-0.032	-0.019	-0.003
	(0.026)	(0.017)	(0.020)	(0.012)	(0.025)	(0.018)	(0.019)	(0.012)
Locus of control (std)	-0.005	-0.001	-0.002	0.009	-0.005	-0.001	-0.002	0.008
	(0.010)	(0.006)	(0.007)	(0.005)	(0.009)	(0.007)	(0.006)	(0.005)
Weighted core academic GPA	0.001	-0.018	0.013	0.004	-0.005	-0.014	0.016	0.004
	(0.015)	(0.010)	(0.010)	(0.006)	(0.015)	(0.010)	(0.010)	(0.007)
Math test score	0.030*	-0.016	-0.008	-0.005	0.030*	-0.017	-0.008	-0.005
	(0.014)	(0.011)	(0.009)	(0.005)	(0.014)	(0.011)	(0.009)	(0.005)
College degree	0.055	-0.027	-0.007	-0.021	0.050	-0.027	-0.004	-0.020
	(0.032)	(0.027)	(0.020)	(0.012)	(0.031)	(0.027)	(0.019)	(0.012)
Physical demands of occupation	-0.016	0.015	0.009	-0.007	-0.019	0.015	0.011	-0.008
	(0.016)	(0.013)	(0.010)	(0.007)	(0.016)	(0.013)	(0.009)	(0.007)
Logged occupational wages	0.058**	-0.034*	-0.028	0.005	0.036	-0.025	-0.015	0.004
	(0.022)	(0.016)	(0.015)	(0.010)	(0.022)	(0.016)	(0.014)	(0.012)
Marital status (ref: married)								
Separated/Divorced/Widowed					-0.085***	0.046**	0.035*	0.005
					(0.024)	(0.017)	(0.017)	(0.009)
Never married					-0.084**	0.053*	0.045	-0.015
					(0.031)	(0.022)	(0.025)	(0.008)
Parental status (ref: parent after 1986)								
Early parent					-0.065**	0.038*	0.011	0.016
					(0.024)	(0.018)	(0.017)	(0.010)
No children					-0.038	0.006	0.017	0.015
					(0.027)	(0.016)	(0.021)	(0.013)

Table 3.3b, *continued*	Model 3				Model 4			
	Working	Disabled	Unemp	Ret/Home	Working	Disabled	Unemp	Ret/Home
Race/ethnicity (ref: non-Hispanic white)								
Black	-0.053*	0.033	0.022	-0.002	-0.042	0.025	0.019	-0.002
	(0.026)	(0.018)	(0.020)	(0.011)	(0.027)	(0.019)	(0.019)	(0.012)
Hispanic	-0.039	0.004	0.026	0.008	-0.030	-0.002	0.024	0.007
	(0.024)	(0.016)	(0.017)	(0.009)	(0.023)	(0.016)	(0.017)	(0.009)
Other race/ethnicity	-0.019	-0.014	0.012	0.021	-0.014	-0.017	0.013	0.018
	(0.036)	(0.029)	(0.020)	(0.015)	(0.035)	(0.029)	(0.020)	(0.014)
Parent has college degree	-0.011	0.002	-0.005	0.014	-0.013	0.004	-0.005	0.014
	(0.019)	(0.014)	(0.013)	(0.008)	(0.019)	(0.014)	(0.013)	(0.009)
Family income	0.000	-0.000	0.000	-0.000	0.000	-0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Lived with both parents	-0.014	0.013	-0.005	0.006	-0.018	0.014	-0.002	0.007
	(0.021)	(0.016)	(0.014)	(0.009)	(0.021)	(0.016)	(0.013)	(0.009)
School urbanicity (ref: urban)								
Suburban	0.040	-0.012	-0.004	-0.024*	0.030	-0.005	-0.001	-0.024*
	(0.025)	(0.016)	(0.019)	(0.011)	(0.024)	(0.016)	(0.018)	(0.011)
Rural	0.060*	-0.012	-0.035*	-0.013	0.048*	-0.005	-0.030	-0.013
	(0.024)	(0.016)	(0.016)	(0.012)	(0.024)	(0.017)	(0.016)	(0.011)
South region	-0.005	-0.007	0.002	0.010	-0.002	-0.010	0.003	0.009
	(0.020)	(0.014)	(0.014)	(0.009)	(0.020)	(0.015)	(0.014)	(0.009)
Private school	-0.009	-0.003	0.022	-0.010	-0.010	-0.002	0.021	-0.009
	(0.027)	(0.021)	(0.015)	(0.010)	(0.028)	(0.023)	(0.015)	(0.011)
Disability in high school	-0.032	0.015	0.006	0.011	-0.030	0.015	0.004	0.011
	(0.026)	(0.016)	(0.015)	(0.014)	(0.027)	(0.017)	(0.015)	(0.016)

*** p<0.001, ** p<0.01, * p<0.05
(Standard errors in parentheses)

Accounting for occupational characteristics in Model 3 explains about 30% of the benefit of a college degree for men, with higher wages promoting employment and protecting against disability. Surprisingly, the physical demands of occupations show no independent relationship to disability. Instead, wages and advanced math seem to reduce men's likelihood of disability. This is consistent with disability exits due to worker discouragement and low opportunity costs for lower-wage workers. However, it also suggests that higher math-related skills help men avoid disability, regardless of the physical demands of their occupations. The final model adds family formation measures, which attenuate the coefficients for wages. This could imply positive selection into marriage or support the idea that men are more motivated or feel more pressure to maintain labor force attachment when they have a family. The latter explanation is consistent with the patterns for both marital and parental status for men. I find opposite effects for women and men if they have never been married, with these men being less likely to be employed but the women *more* likely to be employed. This provides additional evidence that some of the patterns I see for women are due to positive selection out of the labor force, whereas the most advantaged men are more strongly attached to the labor force.

In sum, my results suggest that individuals' skills in adolescence are related to their employment status at midlife partially through educational attainment and occupational characteristics, but these mediators explain more of the relationship for men than for women. For women, math coursework and grades remain protective across all models and independent of midlife work, education, and family characteristics. Higher math-related skills and coursework support employment for men in part because they lead to college degrees and higher-wage occupations. These slightly different processes for men and women are consistent with gendered patterns of achievement in high school and a gendered household division of labor.

DISCUSSION

The ability to hold a job is crucial at midlife, when people accumulate the majority of their retirement savings and are particularly vulnerable to the effects of job loss. However, individuals may face obstacles to work at midlife due to skill obsolescence or deteriorating health, and their susceptibility to and ability to weather these challenges influences their labor force attachment. Though previous research on employment has often focused on individuals' contemporaneous circumstances, this ignores the role that pre-labor market skills may play in preparing people for work across the life course. In this chapter, I investigated how the skills that women and men have at the end of high school are related to their employment status at midlife. Educational and occupational pathways accounted for part of the relationship between skills in adolescence and employment status at midlife, particularly for men. However, my analyses showed that math-related skills in adolescence were associated with employment status at midlife, even independent of educational and occupational pathways, especially for women. These results suggest that early life skills do not operate solely through educational and occupational advantages but that they may imbue individuals with the resources necessary to adapt in the face of adversity or changing circumstances.

While I cannot be certain that the associations observed in this study are causal, several explanations exist as to why skills may operate as protective resources and allow people to adapt in the labor force. As for math, it may be that persons with better math-related skills obtain more advantageous positions *within* their occupations through promotions or raises (Bishop 1991; Gaertner et al. 2014; Joensen and Nielsen 2009; Rose and Betts 2001); my occupation-level measures cannot account for individual variation in wages. It may also be that people with better math-related skills are in better health due to different decision-making processes across the life course (Clouston et al. 2015; House et al. 1994) or that they are more attuned to the costs and benefits of participating in the labor force. Because older workers are more vulnerable to skill

obsolescence, I may also be observing a time when math-related skills are particularly important resources in the labor force.

I found that the math courses people took in high school were related to their employment status at midlife, even independent of achievement measures. Math courses teach students math content, but they also provide logic, reasoning, and learning skills that may support employment even thirty years later. Yet, I cannot rule out that failing to advance beyond lower-level math courses may simply reflect lower stocks of non-cognitive skills like motivation or persistence that also predict labor force attachment. Regardless of the exact explanation, my results show that these courses are particularly important for women's employment in the long run, helping them remain working and avoid disability at midlife.

Math coursework and GPA helped women avoid unemployment, but none of the early skills measures predicted unemployment for men. The fact that few factors were associated with unemployment for men suggests that age discrimination might play a role in unemployment at midlife. Previous research suggests that age discrimination at midlife is likely to impact higher-status workers and those in skilled or semi-skilled occupations (Mendenhall et al. 2008; Roscigno et al. 2007), resulting in a possibly heterogeneous group of individuals who are unemployed at midlife. Men are also more likely to be employed in trades and manufacturing occupations that are declining or stagnating, and thus their employment may be less stable in general and less tied to their skills.

Having a more internal locus of control in adolescence slightly decreased women's probability of being out of the labor force due to disability at midlife but was not otherwise related to employment status, implying a possibly unique association with issues related to disability. Having a more internal locus of control may empower people to obtain better medical management of their health conditions (Strudler Wallston and Wallston 1978) or to take a more proactive role in adapting their work environment to their conditions through requesting accommodations or seeking different employment. Having a greater sense of personal control may prevent individuals from developing health conditions in the first place; but, it likely also

plays a role in shaping how people react in the face of potentially disabling conditions, allowing them to adapt instead of having to leave the workforce (Clarke and Smith 2011).

Education significantly predicted employment for men, consistent with the changing skill demands of the economy. However, college degree attainment only protected against disability for women. This may be, in part, because people's level of education largely determines the kinds of jobs that are available to them (Brandt et al. 2011). For instance, if two people have the same physical limitation, and only one has a bachelor's degree, jobs may exist that either person could *physically* do but that only the bachelor's degree holder is qualified for. In that case, the person without a degree would exit the labor force due to disability, but the bachelor's degree holder could remain working. This highlights that disability is not inherent in a person but rather must be defined in terms of a context. The more physically demanding women's most recent occupation at midlife, the more likely they were to be out of the labor force due to disability. Likewise, as average occupational wages increased, men and women were more likely to be working, men less likely to be disabled, and women less likely to be retired or a homemaker. This supports the argument that workers in higher-paying occupations face greater opportunity costs of leaving the labor force (Autor and Duggan 2003; Burr et al. 1996).

Though employment status is an important general indicator of economic wellbeing at midlife, more specific outcomes could give better insight into the variation within each category of employment status and how well-situated individuals are to continue working or eventually retire. In the following chapters, I investigate how skills in adolescence relate to more individualized measures of economic wellbeing at midlife to better understand the heterogeneity in people's objective and subjective economic circumstances.

Chapter 4: Academic Preparation and Gendered Resilience in a Polarized Labor Market

The shifting of risk and economic burdens from employers to employees and increasing occupational polarization has led to greater prevalence and heightened consequences of bad jobs in the U.S., especially for workers without a college degree. These labor market trends are reflected in designations of jobs as good or bad based on characteristics such as pay and fringe benefits, the skills required, job security and stability, and opportunities for advancement (Kalleberg 2011). The burdens associated with bad jobs have implications for all workers, but they pose unique hardships for workers who find themselves in these jobs later in life, when they have fewer opportunities for upward mobility.

Workers' risks of working in a bad job are shaped by the interaction between their individual characteristics and structural constraints in the labor market. A college degree gives workers access to better occupational opportunities because they possess a credential that employers desire or require (Carnevale and Desrochers 2002; Goldin and Katz 2009; Hout 2012; Sorenson 2000). Workers without a bachelor's degree are largely relegated to the gender-segregated sub-baccalaureate labor market, wherein male-dominated occupations are generally higher-paying than female-dominated occupations (Ainsworth and Roscigno 2005; Carnevale et al. 2013; Grubb 2002; Harlan and Berheide 1994). Though workers' educational attainment and gender structure their access to different segments of the labor market, a great deal of heterogeneity remains even among occupations within these segments and among jobs within those occupations (Grubb 2002; Rosenbaum et al. 2010). Understanding the factors that may protect workers from exposure to bad jobs involves recognizing that jobs exist within a structure of labor market opportunities, which are stratified and unequal.

A worker's position in this structure may be tied to their pre-labor market skills, as skills that are valued by employers or that increase productivity may allow workers to avoid ending up in the worst occupations or jobs. The value of academic-related skills has increased in

occupations across the educational spectrum, as skills not only lead to occupations with higher skill demands but also increase workers' ability to learn on the job and move up within their fields (Balfanz 2009; Bishop 1991; Bozick and Dalton 2013; Bozick et al. 2017; Gaertner et al. 2014; Gamoran 1994; Murnane et al. 1995; Rose and Betts 2001; Rosenbaum 2001). Therefore, the advanced academic coursework in high school that prepares students for college may also help students who do not attain a college degree avoid ending up at the bottom of the labor market in the long run.

Women generally receive greater relative returns to skills and education in the labor market than men, in part due to women's lower wages in sub-baccalaureate occupations (DiPrete and Buchmann 2006; Grubb 2002; Jepsen, Troske, and Coomes 2014; Marcotte et al. 2005). Though women are now more likely to attain a bachelor's degree than men, the best-paying occupations that do not generally require a college degree are still male-dominated. Considering women's lower representation in good sub-baccalaureate occupations and greater returns to schooling, advanced academic preparation in high school may help women avoid ending up in the lowest-skilled and worst occupations. In this chapter, I investigate whether advanced academic preparation in high school is associated with lower exposure to bad jobs at midlife. Midlife is an informative stage for studying the possible labor market benefits of high school coursework because returns to academic coursework and skills intensify as people accumulate work experience and have an opportunity to advance in their careers (Dolton and Vignoles 2002; Gamoran 1994; Grasso and Shea 1979; Murnane et al. 1995; Rose and Betts 2004).

I look beyond workers' employment in bad jobs to incorporate workers' structural risks of exposure to bad jobs, by accounting for the prevalence of bad jobs across occupations and the stratification of labor market opportunities. I expect that academic preparation and skills in high school may provide the greatest benefit to workers relegated to the riskiest segments of the labor market – especially women without a college degree. Because women are at greater risk of working in bad jobs, my findings can enhance my understanding of the factors that contribute to

within- and between-gender inequalities underlying persistent gender disparities at the bottom of the labor market.

In this chapter, I investigate whether more rigorous academic preparation in high school can help people avoid exposure to bad jobs at midlife, when occupational precarity has implications for workers' long-term wellbeing. I examine how the role of academic preparation is shaped by workers' occupational opportunities, which vary by educational attainment and gender. I find that taking higher levels of math coursework in high school protects women from bad occupations and jobs over thirty years later, even when they do not attain a bachelor's degree. My findings underscore the importance of education for women and suggest that rigorous math coursework not only prepares women for college degrees and access to the best jobs; it may also provide a long-run safety net for women who do not complete college degrees.

BACKGROUND

Bad Jobs and the Devolution of Risk in the New Economy

Employers' desire for cost reduction and greater flexibility in a competitive global economy has led to an increase in nonstandard work arrangements, rising employer skill demands, and a general individualization of risk for workers (Acemoglu and Autor 2011; Hacker 2008; Kalleberg 2000, 2009; Kalleberg et al. 2000). The weakening of the social contract between employers and employees has severe implications for U.S. workers, who rely on their jobs for benefits in the absence of universal social safety nets (Kalleberg 2011; Rubin 2014). Though work is becoming more precarious for all workers, the devolution of risk may pose the greatest threat to workers in the lower end of the labor market, a segment that has grown in the polarizing economy (Acemoglu and Autor 2011; Kalleberg 2011; Mouw and Kalleberg 2010). Low-skilled workers are easy to replace and lack the bargaining power necessary to ensure that employers meet even their basic economic needs (see McCall 2000). These workers also experience the greatest hardship in bearing the costs when their jobs do not offer benefits, as they are least able to afford or access benefits on their own. In this study, I refer to jobs that place

these kinds of economic burdens on workers as "bad" jobs, which have been frequently defined as those that pay low wages and do not offer retirement plans or health insurance (Hacker 2008; Hudson 2007; Kalleberg et al. 2000; Mishel, Bernstein, and Allegretto 2007; Raymo et al. 2011).

A job is a particular position with a specific employer (Rosenfeld 1992) and provides valuable information on a worker's position in their current firm, yet shorter firm tenures in the new economy mean that workers rarely stay in the same organizational context for their entire careers. Most studies of bad jobs focus on characteristics of the jobs that workers had at a certain point in time, and I broaden my inquiry to also account for the aggregation of jobs with similar skill demands within occupations (Carbonaro 2007; Kalleberg and Griffin 1980; Rothman 1984; Weeden and Grusky 2005). Occupations delineate meaningful boundaries for workers' employment options and their *risks* of working in a bad job (Bihagen and Ohls 2007; Carbonaro 2007; Kalleberg and Mouw 2018), especially for more experienced workers. Though workers may move between jobs throughout their career, the likelihood that a job change is an *occupation* change declines sharply as workers accumulate labor market experience (Gathmann and Schönberg 2010; Neal 1999).

The incidence of bad jobs within occupations allows an assessment of workers' overall likelihood of employment in bad jobs, regardless of their current job. Further, an occupational measure provides an important structural component of labor market stratification that affects all workers in that occupation (Weeden 2002; Weeden and Grusky 2005). For instance, research has shown that the prevalence of contingent work arrangements within an occupation or industry is actually more consequential for an individual's wages than their own work arrangement (Wallace and Fullerton 2003). Occupational characteristics, then, also gauge the possible collateral effects on workers in an occupation with a larger share of bad jobs.

In my study, I focus on occupational characteristics that represent economic burdens imposed on workers by employers and that denote a lack of worker agency in assuming these burdens: low wages, low availability of health insurance, low availability of retirement benefits, and a high proportion of involuntary part-time workers. Among the four characteristics, low

wages may be the most patent and widely-used indicator of "bad" jobs, and declines in the real value of the minimum wage has only exacerbated the situation of low-wage workers (McCall 2000; Moore 2018). Further, employment in low-wage occupations at midlife, when workers should be nearing their peak earnings (Lachman 2004; Mendenhall et al. 2008), has implications for long-term wellbeing in the face of increased life expectancy (Mermin et al. 2007; O'Rand 2011; Virick 2011).

Lower availability of health insurance or retirement benefits represent significant ways in which economic risk has shifted from employers to employees (Mishel et al. 2007), and they are hallmark features of bad jobs (Hudson 2007; Kalleberg et al. 2000). Poor access to health insurance or retirement benefits can have lasting consequences for workers' health and economic security as they age. Finally, a high proportion of involuntary part-time workers indicates a systemic demand for part-time work arrangements and speaks to more general trends of increasing employment insecurity, as part-time work becomes increasingly driven by employers' desires rather than employees' preferences (Kalleberg 2000; Larson and Ong 1994). Part-time workers work fewer and more erratic hours, but employers also have no obligation and little incentive to give part-time employees access to benefits even if they are available to full-time employees (Kalleberg et al. 2000).

Scholars have debated the extent to which bad job characteristics cluster – that is, whether a job that is bad on one characteristic is also likely to be bad on others (Hudson 2007; Piore 1970). The clustering of bad characteristics in an occupation increases workers' risks of being exposed to at least one of those characteristics at some point in their careers and encountering multiple bad characteristics in the same job. As bad characteristics cluster, their burden on workers may become multiplicative; not having health insurance *and* earning low wages means that workers not only bear the cost of health insurance but also have less ability to bear it. In my analyses, I measure bad occupations and jobs using a count of characteristics, which captures the increasing burdens and risks workers face when bad characteristics cluster.

Bad jobs undoubtedly take a toll on workers' immediate economic wellbeing, yet bad jobs may carry fewer long-term consequences if workers' exposure to them are transitory and occupational mobility is high (see Hudson 2007). However, this is likely not the case for workers in bad occupations or jobs at age 50. Younger workers have more time and opportunity to move out of bad jobs or occupations and re-skill; employers are less likely to invest in older workers (Mendenhall et al. 2008; Roscigno et al. 2007; Virick 2011). Compared to younger workers, middle-aged workers in bad jobs or occupations are in a worse position relative to their peers, who have advanced in their careers over the life course. Workers in bad occupations at midlife may have to work longer in worse occupations than their peers and face lasting economic consequences because they are less able to save for retirement or move to another occupation (Raymo et al. 2011). If pre-labor market skills lower workers' likelihood of employment in bad occupations or jobs later in life, workers who took higher levels of academic coursework in high school may be shielded against exposure to bad jobs at a pivotal point in the life course.

Academic Preparation in High School as a Safety Net in the Long-Run Labor Market

Though the general link between education and labor market outcomes is well-established, much of the previous research focuses on educational attainment rather than the content of education. This is often for practical reasons due to data availability, but it may also be that the process by which education may benefit workers in the labor market is less apparent when looking at people with the same level of educational attainment (McCall 2000). Unlike countries with content-specific credentialing, students in the U.S. leave high school with the same general credential but varying levels of skills and academic preparation (Bills 2003; Bishop 1993). How do workers exhibit or employers ascertain those competencies?

Previous research suggests that returns to skills and coursework only emerge over time, implying that any sorting or rewards based on these factors do not occur when people first enter the labor market (Dolton and Vignoles 2002; Gamoran 1994; Grasso and Shea 1979; Murnane et al. 1995; Rose and Betts 2004). However, as people progress in their careers, workers with skills

valued by employers may be able to use their skills and experience to move into better jobs or occupations, possibly even as a substitution for education requirements. Theories of employer learning suggest that workers' skills become apparent to and rewarded by employers over time through work performance (Altonji and Pierret 2001; Farber and Gibbons 1996; Lange 2007). Further, proponents of skill-biased technological change argue that within-education inequality increases as occupational skill demands increase, with workers who adapt to new technologies leaving behind less adaptable workers with lower skills but the same educational credential (Acemoglu 2002; Juhn, Murphy, and Pierce 1993; Lemieux 2006).

Over the past few decades, schools have intensified their academic curricula in response to the increasing importance of a college degree for access to good jobs and rising employer demands for quantitative and analytic skills (Bozick and Dalton 2013; Bozick et al. 2017; Gamoran 1994; Murnane et al. 1995). Even employers in jobs that do not require a college degree want workers to have general academic competencies and the ability to learn on the job (Rosenbaum 2001). Considering that extant research has found that mathematics is the academic subject that best predicts labor market outcomes (Adkins and Noyes 2016; Altonji et al. 2012; Dolton and Vignoles 2002; Goodman 2012; Rose and Betts 2004), I expect that math coursework and skills may be most closely related to individuals' exposure to bad jobs. However, I still include a variety of other core academic subjects to account for the possibility of distinct processes for this particular outcome.

Labor Market Stratification and the Structure of Occupational Opportunities

Stratification and segregation in the labor market shape the relationship between workers' academic preparation and their risks of exposure to bad jobs through boundaries in the labor market that circumscribe occupational opportunities (Carbonaro 2007). These boundaries create both vertical and horizontal occupational inequalities (see Charles 2003). Vertical inequalities arise from the sorting of workers into higher and lower labor market strata, whereas horizontal inequalities are the result of the sorting of workers across occupations within strata. These

processes of stratification contribute to educational and gender inequalities in occupational opportunities and have significant implications for workers' risks of exposure to bad jobs.

Arguably, the most consequential labor market boundary relates to educational requirements, considering that a college degree has become increasingly important in entering good occupations (Carnevale and Desrochers 2002; Goldin and Katz 2009; Hout 2012; Sorenson 2000). People without a college degree are blocked from occupations that require this credential, either as a formal prerequisite for entry into a profession or as an informal occupational norm. I expect that people with college degrees will be largely insulated against exposure to bad jobs because they possess a credential that gives them greater bargaining power and access to better-quality occupations.

Occupational gender segregation illustrates another boundary that restricts access to occupational opportunities, as women are generally more likely to be in bad jobs than men (Kalleberg et al. 2000). Occupational gender segregation and the systematic devaluation of women's labor place women at greater risk of being in the worst occupations, especially women without a college degree (Ainsworth and Roscigno 2005; Carnevale et al. 2013; England 2010; Grubb 2002; Harlan and Berheide 1994; Kilbourne et al. 1994). Though occupations that require a bachelor's degree tend to be more egalitarian, sub-baccalaureate occupations are highly gender-segregated, with men maintaining a stronghold over well-paying blue-collar work and women concentrated in low-wage service occupations. Thus, it is likely that women are more likely to encounter bad jobs at midlife, as barriers to decent mid-skill work and supervisory positions within their fields may impede women's access to better occupations and career progression across the life course (Harlan and Berheide 1994; Mitra 2003; Rosenfeld, Van Buren, and Kalleberg 1998; Werum 2002).

Occupational gender segregation has implications for both horizontal and vertical inequalities in workers' exposure to bad jobs. First, the sorting of men and women into different types of occupations puts women at greater occupational risk because female-dominated occupations are systematically worse in quality than male-dominated occupations (Blau and

Kahn 2000; England 2006; Tomaskovic-Devey and Skaggs 2002). It is possible that women with better academic preparation and skills may be able to avoid female-dominated occupations and enter gender-neutral or male-dominated occupations, as women with bachelor's degrees have done (England 2010; McCall 2000; Moore 2018). However, sub-baccalaureate occupations vary widely in terms of quality and skill demands, even within male- and female-dominated segments of the labor market. Thus, it may also be that better skills and preparation could allow women to enter better female-dominated occupations with higher skill demands. Indeed, previous research suggests that women will only cross the gender divide if no better female-dominated occupations are available and entry into the male-dominated occupations is not too difficult (England 2010).

Because men and women are segregated into different segments of the sub-baccalaureate labor market, the factors that contribute to inequalities *between* men's and women's occupations may be distinct from those that produce stratification *within* the realm of women's opportunities. Both sources of inequality are important components of women's disadvantages in the labor market (McCall 2000). The competencies developed in academic coursework should only be rewarded if those skills are actually used in the labor market (Bishop 1993). Because male-dominated occupations often involve manual labor, men may be able to enter better occupations even when they have relatively low academic-related skills. However, these skills may be crucial to women's ability to enter better female-dominated occupations that may be more cognitively demanding (Bishop 1985). I account for the gendered nature of occupational opportunities by focusing my primary inquiry on within-gender estimates of the association between academic preparation and exposure to bad jobs.

Workers' educational attainment and gender shape how their skills and preparation are linked to their employment outcomes through nested layers of inequality in the labor market – access to segments of the labor market, occupations within those segments, and finally, jobs within those occupations. In this study, I incorporate these layers of structural risk into my investigation of how academic preparation relates to workers' risks of exposure to bad jobs in the long run. Specifically, I ask if advanced academic preparation in high school is related to

women's and men's employment in bad occupations or jobs at midlife, with attention to how workers' occupational opportunities shape this relationship. Considering women's greater likelihood of employment in bad jobs, I pay attention to both within- and between-gender inequalities to understand the sources of women's disadvantages and whether academic preparation may play a role in alleviating long-run gender inequalities at the bottom of the labor market. Overall, I hypothesize that advanced academic preparation in high school may help workers avoid bad occupations and jobs by giving them access to better occupations and helping them advance in their careers over time. Further, I expect that any benefit of academic preparation will be greatest for women without college degrees, who are relegated to the riskiest segment of the labor market.

METHODS

Data and Sample

This chapter uses data from the sophomore cohort of HS&B. For all analyses, I only include respondents who reported a current or most recent occupation on the 2014 follow-up that could be coded to the SOC and who were not missing on my dependent variables. Thus, for outcomes that appeared on the survey for all respondents, I have a sample of 8,040 for analyses predicting bad occupational characteristics and 8,010 for part-time jobs. For outcomes that only appeared on the extended version of the survey, I have a sample of 3,390 for analyses predicting retirement benefits and 2,820 for low wages[2].

Exposure to Bad Jobs at Midlife

Bad Occupational Characteristics. Following the approach of Kalleberg and colleagues (2000), I estimate the "badness" of an occupation with a count of characteristics. These characteristics assess the extent of workers' *access* to economic benefits in their occupations: (1)

[2] All respondents who have ever worked for pay were asked to provide information on their current or most recent job, including typical hours and availability of a retirement plan. However, hourly wages are only available for people who worked for pay in 2012 and reported non-zero earnings, number of weeks worked, and work hours.

low wages, (2) low availability of health insurance, (3) low availability of retirement benefits, and (4) high proportion of involuntary part-time workers. I use the CPS samples to construct occupational measures using job characteristics reported by workers ages 45 to 55[3] to gauge HS&B sample members' risks of exposure to these characteristics. Low-wage occupations are defined as those in the bottom national quintile of median occupational wages among workers ages 45 to 55 (Kalleberg et al. 2000). Low availability of health insurance and retirement benefits refer to the proportion of workers in an occupation with access to these employee benefits, regardless of whether the workers actually participated (Raymo et al. 2011). I assess the prevalence of involuntary part-time workers through the proportion of workers in an occupation that work part-time for economic reasons. As with wages, I count an occupation as "bad" on any of these characteristics if it falls in the worst national quintile among workers ages 45 to 55. I sum these dichotomous measures to create a count of bad characteristics for each occupation[4].

Bad Job Characteristics. I have comparable measures of HS&B respondents' job characteristics from the 2014 midlife follow-up on 3 of the 4 characteristics I use for the occupational count: part-time work, low wages, and lack of retirement benefits. I consider part-time work as 30 or fewer hours per week; unfortunately, unlike the CPS, the midlife survey does not distinguish between voluntary and involuntary part-time work. I categorize low wages as less than $13.50/hour,[5] which corresponds to the bottom quintile of age-specific median occupational wages from the CPS. A job lacks retirement benefits if the respondent reports that their employer does not offer any type of retirement plan. I also create a count of these three job characteristics, for comparability with the count of occupational characteristics.

[3] Results are also consistent using overall occupational averages, rather than age-specific.
[4] I transformed 6-digit SOC occupational averages (or medians for wages) into national percentiles, weighting for labor share.
[5] Hourly wages were calculated using 2012 annual earnings-related income (including wages, salaries, commissions, and tips), weeks worked, and typical hours worked per week.

Occupational Characteristics

Education Requirements of Occupation. I empirically assess the benefit of bachelor's degrees with a measure of occupational education requirements, which indicates the proportion of workers in an occupation that report that their job requires a bachelor's degree, derived from the O*NET. Consistent with recent economic trends, occupations are clustered at the poles of the distribution with most either overwhelmingly requiring or not requiring a bachelor's degree. To account for the polarized nature of the occupational distribution, I categorize occupations as requiring a bachelor's degree (>70% jobs require a BA), mixed-education (reference), or sub-baccalaureate (<30% jobs require a BA).[6]

Occupational Gender Composition. Though bachelor's degrees give people greater access to good occupations, sub-baccalaureate occupations vary considerably in terms of access, quality, and skill demands. Because the sub-baccalaureate labor market remains highly gender-segregated, I created a categorical measure of occupational gender composition using the ACS sample and define occupations as: gender-neutral (reference), male-dominated (>70% men), or female-dominated (>70% women) (Glauber 2012; Jacobs 1989; Kmec 2005).

Occupational Skill Demands. Academic preparation should help workers in the labor market when the skills fostered by the coursework align with the skills demanded by occupations (Bishop 1993). Previous research indicates – and my analyses suggest – that mathematics is the strongest predictor of labor market outcomes among academic subjects (Adkins and Noyes 2016; Altonji et al. 2012; Dolton and Vignoles 2002; Goodman 2012; Rose and Betts 2004). Thus, I include a measure of the level of mathematics knowledge demanded in an occupation which I derived from the O*NET, allowing me to estimate a potential mechanism through which more advanced mathematics coursework may help workers stay afloat in the long-run labor market.

To account for recency of reported occupations, I also include a flag that indicates whether a respondent had worked in the 5 years preceding the 2014 survey; about 7% of the

[6] Alternate categorizations yield similar results.

sample who reports an occupation also reports not working in the past 5 years. Analyses excluding these respondents yield similar results.

Descriptive Statistics

Table 4.1 presents weighted means and proportions for my main analytic variables, by gender and educational attainment.[7] Among respondents without a college degree, over 40% of women have an occupation that is bad on at least one characteristic, as opposed to only about 30% of men. About 14% of women without a college degree are in an occupation that is "bad" on all four characteristics, compared to only 3% of men. Men and women with bachelor's degrees are similarly shielded from bad occupations, but women are more likely to have a bad *job* than their male peers even if they have a bachelor's degree. The occupational measures illustrate the expected stratification in the labor market by gender and educational attainment. Finally, I see that women and men without bachelor's degrees took similar levels of advanced coursework; yet, women still end up in worse occupations and jobs.

[7] Table A2 presents weighted means and proportions for control variables, by gender and educational attainment.

Table 4.1: Weighted Means and Proportions of Main Analytic Variables, by Degree Attainment and Gender

	No Bachelor's Degree			Bachelor's Degree		
	Women		**Men**	**Women**		**Men**
Sample (n=8,040)	.29		.29	.22		.20
Bad Occupations and Jobs						
Number of bad occupational characteristics						
0	.59	†	.68	.78		.80
1	.10		.13	.08	†	.11
2	.09		.09	.07	†	.04
3	.08		.07	.04		.04
4	.14	†	.03	.02		.01
Bad occupational characteristics						
Low wages	.29	†	.15	.06		.05
Low availability of health insurance	.23	†	.19	.14		.17
Low availability of retirement benefits	.25	†	.18	.07		.07
High % of involuntary part-time workers	.33	†	.12	.16		.07
Number of bad job characteristics						
0	.46	†	.58	.57	†	.79
1	.30		.30	.28	†	.16
2	.22	†	.12	.14	†	.05
3	.03	†	.01	.01		.01
Bad job characteristics						
Part-time hours (n=8,010)	.21	†	.07	.19	†	.05
Low wages (n=2,820)	.26	†	.14	.11	†	.03
Lacks retirement benefits (n=3,390)	.41		.39	.32	†	.20
Occupational Measures						
Education required						
Sub-baccalaureate	.65	†	.71	.22		.19
Mixed-education	.23	†	.17	.24	†	.32
Bachelor's degree required	.13		.12	.53		.50
Gender composition of occupation						
Female-dominated	.49	†	.05	.36	†	.09
Gender-neutral	.38	†	.27	.53		.52
Male-dominated	.13	†	.68	.11	†	.39
Math knowledge demands of occupation	2.95		3.23	3.54		3.79
	(.99)	†	(.95)	(.85)	†	(.87)

Table 4.1, *continued*	No Bachelor's Degree			Bachelor's Degree		
Academic Preparation in High School						
Highest math course						
< Algebra 1	.43	†	.47	.15		.13
Algebra 1	.23		.21	.10		.09
Geometry	.14	†	.11	.16	†	.10
Algebra 2 or above	.21		.21	.59	†	.68
Highest science course						
<Biology	.22		.21	.06		.05
Biology	.56		.55	.34	†	.26
Chemistry	.12		.12	.29	†	.23
Above chemistry	.10	†	.13	.31	†	.45
Took honors English	.09	†	.06	.22		.19
Number of foreign language credits	.70		.49	1.93		1.53
	(1.08)	†	(.96)	(1.47)	†	(1.33)
Senior year math test Score (std.)	-.41		-.32	.59		.81
	(.81)	†	(.82)	(.87)	†	(.88)
Cumulative weighted core academic	2.19		1.95	2.83		2.69
GPA	(.67)	†	(.58)	(.70)	†	(.66)
Senior year locus of control (std.)	-.11		-.28	.42		.32
	(1.03)	†	(1.00)	(.79)	†	(.80)

† indicates a significant gender difference at p<.05

ANALYTIC PLAN

My analyses investigate how rigorous academic preparation in high school shapes men's and women's exposure to bad jobs at midlife, accounting for structural barriers that constrain individuals' occupational opportunities. I first investigate the relationship between academic preparation and the prevalence of bad jobs within men's and women's occupations with a series of negative binomial regressions that predict the number of bad characteristics associated with respondents' occupations. I use negative binomial regressions to account for overdispersion in the occupational count measure. First, I estimate regressions for my entire analytic sample and nest models to account for respondents' degree attainment and the educational requirements of their occupations. Next, I estimate similar negative binomial regressions among respondents without a college degree, and I nest models to account for occupational gender composition and

skill demands. After estimating gender-stratified models, I pool my samples and present a series of nonlinear Oaxaca-Blinder decompositions to examine the sources of the gender gap in occupational quality and how they differ from sources of within-gender inequalities.

I then shift my focus from respondents' occupations to the actual jobs that they held at the time of the 2014 midlife survey. I first estimate a series of logistic regression models predicting respondents' likelihood of being in jobs with each bad characteristic, then present Poisson regressions that predict the number of bad job characteristics. As with my estimates of respondents' occupations, I present models for the full sample and then among individuals without a college degree. I include degree attainment and bad occupational characteristics in nested models to assess workers' exposure to bad jobs within the context of their structural risk.

My final analyses summarize my results by placing my estimated within-group inequalities in the context of the broader labor market. Specifically, I present graphs of average predicted counts of bad occupational and job characteristics based on my multivariate regression models, by gender, degree attainment, and college-preparatory math course-taking. In the predictions of job characteristics, I control for occupational characteristics, allowing a comparison of inequalities across and within occupational contexts. This graphical summary contextualizes my findings in terms of the relative magnitude of differences between and within groups, and it provides a visual representation of the structural boundaries that shape the relationship between workers' characteristics and labor market outcomes.

All regression analyses are stratified by gender to account for gendered labor market processes, and I indicate any statistically significant gender differences in coefficients across models. I present negative binomial, Poisson, and logistic coefficients as AMEs. In my results, an AME can be interpreted as the *average change in the number of characteristics* for negative binomial and Poisson models and as the *average percentage point change in probability* for logistic regression models.

Robustness Checks. I conducted a number of robustness checks on my analyses to account for selection into coursework, including school-fixed effects, coarsened exact matching,

propensity score matching, and inverse probability weighting. Results were similar across methods, implying that selection into coursework is not driving my findings. I also tested alternate operationalizations of my outcome variable. I summed bad job characteristics at the individual level in the CPS sample before aggregating to the occupation level; this yielded similar results but less reliable occupational measures due to reduced sample size in the CPS. I also constructed a continuous index from the occupational percentile measures and ran conditional and unconditional quantile regressions using different cutpoints. These quantile regressions confirmed that the relationships I find in my analyses are concentrated in the bottom quintile of the occupational distribution (the "bad" jobs).

RESULTS

College Degree Attainment and Access to Good Occupations

In Table 4.2, I estimate the relationship between academic preparation in high school and men's and women's number of bad occupational characteristics at midlife, with attention to the role of college degree attainment in protecting workers from the worst occupations. Model 1 shows that workers with better academic preparation and skills hold occupations with fewer bad characteristics. Both women and men realize some long-term benefit from higher skills and achievement, particularly math achievement. Yet, taking more rigorous academic coursework only matters for women, and it is specifically *math* coursework that plays a significant role in keeping women out of the worst jobs in the long run. I see in Model 2 that college degree attainment does not explain the predicted effects of math coursework. On average and net of degree attainment, women who took Algebra 2 or above in high school have about .24 fewer bad occupational characteristics than women who did not advance to Algebra 1; this is comparable to the magnitude of the protection associated with a *college degree* for men. However, even net of coursework, women with a college degree have about .41 fewer bad characteristics than women without this credential, suggesting that bachelor's degree attainment is a vital component of women's occupational vulnerability.

Table 4.2. AMEs from Negative Binomial Regressions Predicting Number of Bad Occupational Characteristics at Midlife

	Women			Men		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Completed a bachelor's degree or above		-0.413***	0.068		-0.254***	-0.080
		(0.084)	(0.081)		(0.066)	(0.064)
Education required for occupation (ref: mixed)						
Sub-baccalaureate			0.999*** †			0.319***
			(0.059)			(0.059)
Bachelor's degree required			-0.184***			-0.220***
			(0.040)			(0.045)
Highest math course in high school (ref: < Algebra 1)						
Algebra 1	-0.208** †	-0.219** †	-0.229** †	0.008	0.004	0.006
	(0.077)	(0.076)	(0.073)	(0.064)	(0.064)	(0.066)
Geometry	-0.266** †	-0.251** †	-0.245** †	-0.002	0.003	-0.008
	(0.093)	(0.093)	(0.093)	(0.080)	(0.081)	(0.077)
Algebra 2 or above	-0.276** †	-0.243** †	-0.247** †	0.076	0.092	0.073
	(0.086)	(0.086)	(0.080)	(0.075)	(0.074)	(0.071)
Highest science course in high school (ref: < Biology)						
Biology	-0.040	-0.050	-0.048	-0.034	-0.028	-0.004
	(0.082)	(0.082)	(0.074)	(0.075)	(0.074)	(0.070)
Chemistry	-0.109	-0.080	-0.041	0.015	0.040	0.065
	(0.116)	(0.117)	(0.115)	(0.100)	(0.101)	(0.095)
Above Chemistry	-0.067	-0.046	0.024	-0.106	-0.076	-0.019
	(0.117)	(0.117)	(0.110)	(0.090)	(0.089)	(0.084)

Table 4.2, *continued*	Women			Men		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Took at least 1 honors English course	-0.082	-0.077	-0.022	0.144	0.167*	0.140
	(0.099)	(0.098)	(0.093)	(0.081)	(0.082)	(0.072)
Number of foreign language credits	-0.012	0.014	0.044	-0.011	0.003	0.006
	(0.029)	(0.029)	(0.028)	(0.025)	(0.026)	(0.024)
12th grade math test score (std.)	-0.195***	-0.157**	-0.107*	-0.115**	-0.099*	-0.060
	(0.052)	(0.052)	(0.051)	(0.039)	(0.038)	(0.038)
12th grade locus of control (std.)	-0.048	-0.039	-0.023	-0.037	-0.030	-0.023
	(0.030)	(0.030)	(0.029)	(0.024)	(0.024)	(0.024)
Weighted core academic GPA	-0.122*	-0.092	-0.076	-0.026	0.005	0.022
	(0.054)	(0.054)	(0.052)	(0.043)	(0.043)	(0.043)
n=4,320 women and 3,710 men						

† indicates a statistically significant gender difference in coefficients
*** p<0.001, ** p<0.01, * p<0.05
(Standard errors in parentheses)
All models include the following covariates: race/ethnicity, parental education, parental income, family structure, high school urbanicity, South residence in high school, high school sector, and whether a respondent has worked in the past 5 years

I hypothesized that a college degree would insulate people from exposure to bad jobs in large part by affording access to occupations that require a college degree, and Model 3 strongly supports this hypothesis. For both men and women, the educational requirements of occupations completely explain the benefit of bachelor's degrees: they keep people out of the segment of the labor market that carries the greatest risk of exposure to bad jobs. The hazard of sub-baccalaureate occupations is significantly greater for women, bolstering the argument that college degrees provide crucial economic safety nets for women. The mechanisms in Models 2 and 3 explain much of the estimated effect of math test scores for both men and women but almost none of the benefit associated with higher levels of math coursework. This implies that 1) math achievement tests and math coursework may represent distinct sets of skills in relation to people's occupational risks and 2) the skills measured by math test scores may help people enter occupations with higher educational requirements, regardless of degree attainment.

Gender Segregation and Vertical and Horizontal Occupational Inequalities

The results from Table 4.2 suggest that more rigorous math coursework may help women avoid bad occupations even if they do not attain a college degree, though a college degree helps people avoid the sub-baccalaureate labor market, where bad occupations are concentrated. Occupations within the sub-baccalaureate labor market vary widely in quality, and workers who leave high school with skills that are desired by employers or conducive to productivity may fare better in the long run. Considering persistent occupational gender segregation, women and men may be effectively working in different segments of the sub-baccalaureate labor market, with distinct processes driving occupational access and rewards within gendered contexts.

I examine these processes in Table 4.3 by narrowing my focus to concentrate on respondents without the advantage of a college degree. Though the general patterns in Model 1 are similar to the full sample (Table 4.2), the association between more rigorous math coursework and bad occupational characteristics is more striking when I only look at women without college degrees. On average, women who advanced to Algebra 2 or above have about

.39 fewer bad occupational characteristics than women who took the lowest levels of math. This suggests that more rigorous math courses are associated with benefits for women in the labor market even when the coursework does not lead to bachelor's degrees.

The gender-divergent trends I see are likely tied to occupational gender segregation, which could influence the relationship between academic preparation and occupational quality through either horizontal or vertical processes of inequality (Charles 2003). In Model 2, I assess the role of horizontal inequality by accounting for the sorting of men and women into different types of occupations. Because female-dominated occupations are generally of lower quality, it may be that math-related skills help women enter gender-neutral or male-dominated occupations. I see that occupational gender composition does not explain the benefit of math coursework for women, though gender segregation has a substantial estimated effect for women's occupational characteristics. Employment in male-dominated (-1.110 vs. gender neutral) compared to female-dominated occupations (.363 vs. gender neutral) translates into about 1.5 fewer bad occupational characteristics for women without college degrees if they cross the gender divide into male-dominated occupations. Further, the advantage for women without a college degree in holding male-dominated occupations versus gender-neutral occupations is almost three times the magnitude of advantage that women receive from a *college degree* (see Table 4.2, Model 2).

Table 4.3. AMEs from Negative Binomial Regressions Predicting Number of Bad Occupational Characteristics at Midlife Among Women and Men without a College Degree

	Women				Men			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Occupational math knowledge demands			-0.935*** †	-0.942*** †			-0.299***	-0.244***
			(0.061)	(0.076)			(0.035)	(0.035)
Occupational gender composition (ref: gender-neutral)								
Female-dominated		0.363***		-0.194		0.273*		0.126
		(0.083)		(0.102)		(0.109)		(0.098)
Male-dominated		-1.110*** †		-1.237*** †		-0.442***		-0.354***
		(0.208)		(0.229)		(0.062)		(0.062)
Highest math course in high school (ref: < Algebra 1)								
Algebra 1	-0.222*	-0.224*	-0.156	-0.141	-0.017	-0.014	0.009	0.003
	(0.103)	(0.101)	(0.103)	(0.101)	(0.079)	(0.080)	(0.084)	(0.083)
Geometry	-0.390**	-0.394**	-0.258	-0.276*	-0.108	-0.113	-0.094	-0.103
	(0.129)	(0.128)	(0.135)	(0.134)	(0.099)	(0.096)	(0.098)	(0.096)
Algebra 2 or above	-0.386** †	-0.351** †	-0.214 †	-0.202 †	0.145	0.122	0.118	0.105
	(0.122)	(0.127)	(0.128)	(0.127)	(0.108)	(0.108)	(0.102)	(0.102)

Table 4.3, *continued*	Women				Men			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Highest science course in high school (ref: < Biology)								
Biology	-0.028	-0.012	0.014	0.042	-0.053	-0.047	-0.033	-0.037
	(0.107)	(0.104)	(0.111)	(0.110)	(0.089)	(0.087)	(0.086)	(0.085)
Chemistry	-0.155	-0.173	-0.084	-0.083	0.035	0.050	0.056	0.059
	(0.164)	(0.155)	(0.174)	(0.168)	(0.130)	(0.133)	(0.126)	(0.129)
Above Chemistry	0.088	0.070	0.134	0.146	-0.055	-0.026	-0.017	-0.013
	(0.186)	(0.172)	(0.174)	(0.169)	(0.122)	(0.121)	(0.115)	(0.116)
Took at least 1 honors English course	-0.021	-0.022	-0.041	-0.071	0.161	0.143	0.204	0.183
	(0.158)	(0.157)	(0.154)	(0.155)	(0.129)	(0.128)	(0.134)	(0.133)
Number of foreign language credits	-0.014	-0.013	0.024	0.010	-0.036	-0.044	-0.040	-0.043
	(0.048)	(0.046)	(0.046)	(0.045)	(0.041)	(0.041)	(0.038)	(0.038)
12th grade math test score (std.)	-0.215**	-0.205**	-0.177*	-0.173*	-0.062	-0.063	-0.014	-0.023
	(0.075)	(0.076)	(0.076)	(0.076)	(0.052)	(0.053)	(0.050)	(0.050)
12th grade locus of control (std.)	-0.050	-0.061	0.028	0.019	-0.049	-0.037	-0.031	-0.026
	(0.042)	(0.042)	(0.045)	(0.046)	(0.032)	(0.031)	(0.032)	(0.031)
Weighted core academic GPA	-0.131	-0.151	-0.134	-0.125	0.035	-0.026	0.010	-0.031
	(0.079)	(0.077)	(0.079)	(0.077)	(0.057)	(0.059)	(0.058)	(0.059)
n=2,480 women and 2,200 men								

† indicates a statistically significant gender difference in coefficients
*** p<0.001, ** p<0.01, * p<0.05
(Standard errors in parentheses)

All models include the following covariates: race/ethnicity, parental education, parental income, family structure, high school urbanicity, South residence in high school, high school sector, and whether a respondent has worked in the past 5 years

Next, I estimate the role of vertical inequality tied to gender segregation, or the sorting among men and women into occupations with varying levels of skill demands. It is possible that math is important for women without a college degree because higher levels of math coursework may foster skills that are valuable in the non-manual occupations women are likely to enter. I test this proposition in Model 3 by introducing a measure of the level of math knowledge associated with respondents' occupations. The math knowledge demands of women's occupations explain a substantial portion of advancing to Algebra 1 (30%), Geometry (35%), or Algebra 2 (45%) compared to taking only the lowest levels of math. The coefficients are attenuated to marginal significance, even though the point estimates remain below zero, likely the result of reduced statistical power. These skill demands only explain about 20% of the estimated effect of math achievement test scores for women, and taking Algebra 2 or above remains significantly more important for women's occupational quality than men's. Thus, taking more advanced math may benefit women in the labor market regardless of the math knowledge required in their occupations.

In Model 4, I see that lower skill demands explain why female-dominated occupations are worse than gender-neutral occupations, but none of the advantage associated with male-dominated occupations, which remain significantly more beneficial for women's occupational quality than men's. Even net of occupational gender composition, math knowledge demands retain a significantly stronger relationship to the clustering of bad occupational characteristics for women than for men. By graphing this relationship in Figure 4.1 (calculated from Model 4), I gain a clearer idea of the source of the gender difference. Figure 4.1 shows that the disadvantage for women is concentrated in the lower half of the distribution of math knowledge demands, and women's occupations that demand higher levels of math knowledge actually look a bit better than men's. Thus, without a college degree, women have much farther to fall if they are not prepared to enter occupations with at least average math knowledge demands.

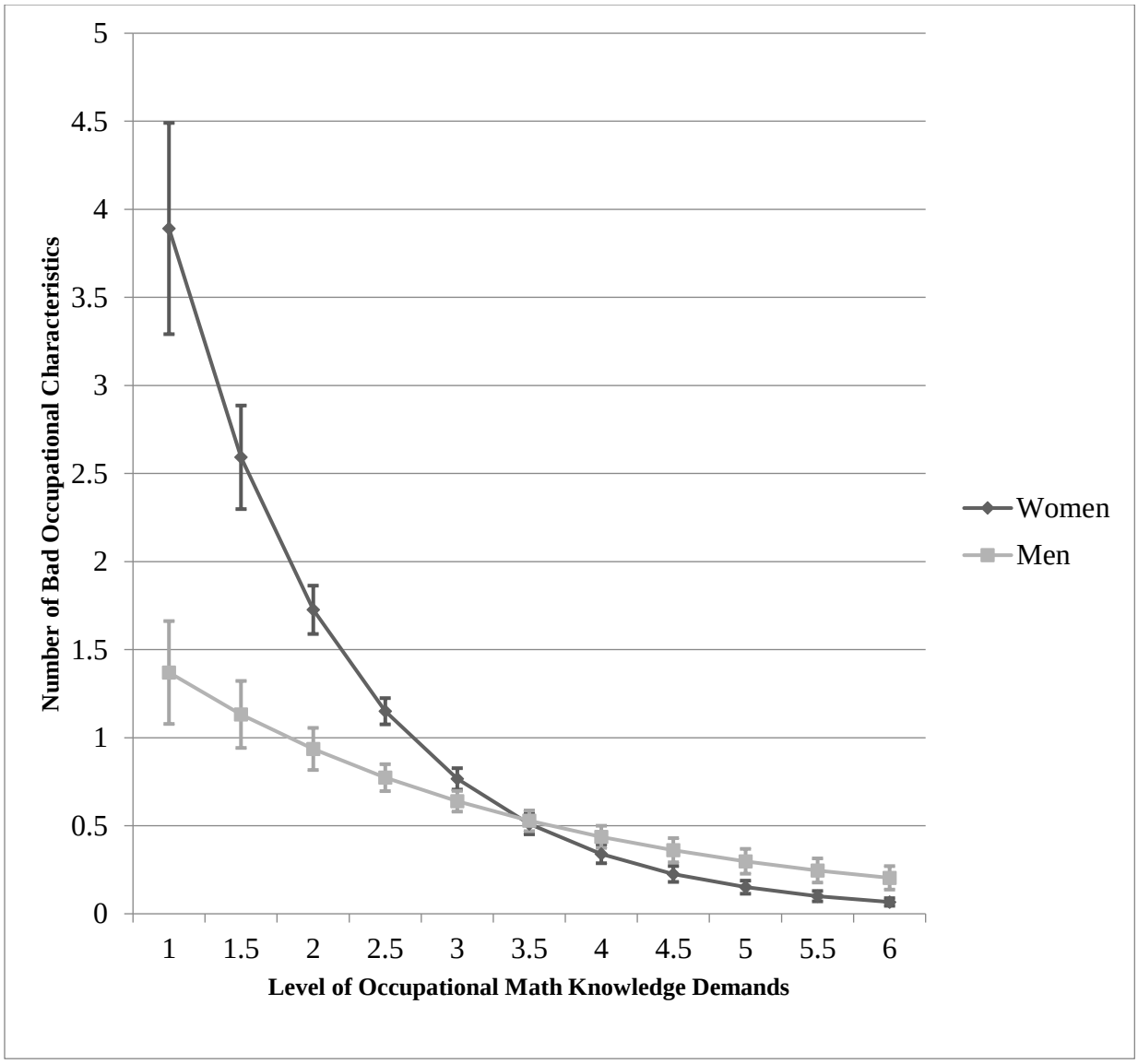


Figure 4.1. Average Predicted Counts of Bad Occupational Characteristics for Men and Women without a College Degree, by Level of Occupational Math Knowledge Demands

Notes: Predictions for women and men from Table 4.3, Model 4, with 95% confidence intervals

My gender-stratified models gave me insight into the processes of within-gender inequalities in the context of gendered opportunity structures. In Table 4.4, I now turn my focus to examining between-gender inequalities with a decomposition of the overall gender gap in the number of bad occupational characteristics. I see that, on average, women have about .3 more bad occupational characteristics than similar men, and workers' individual characteristics explain almost none of the gender gap. Models 2 and 3 indicate that occupational gender segregation among workers without college degrees can explain more of the gender gap in bad occupational characteristics than skill demands can, though I saw that the opposite was true in explaining variation *among* these women based on their math coursework. Together, the within- and between-gender findings underscore the importance of considering variation among women when examining the average gender gap in the labor market, as the disadvantage of lower-skilled women derives from both sources of inequality and their distinct mechanisms.

Table 4.4. Decomposition of the Gender Gap in Number of Bad Occupational Characteristics

	Model 1	Model 2	Model 3	Model 4
Average gender gap (# bad occupational characteristics)	0.3	0.28	0.35	0.33
Percent explained:	**1%**	**119%**	**48%**	**100%**
Percent unexplained:	**99%**	**-19%**	**52%**	**0%**
All pre-labor market characteristics (including college degree)	x	x	x	x
Sub-baccalaureate occupational gender composition		x		x
Sub-baccalaureate occupational math knowledge demands			x	x
n=8,040				

Bad Jobs within Occupational Contexts

Occupations are crucial units of analysis for understanding the link between education and the labor market, as educational and skill requirements typically inhere in occupations and circumscribe individuals' access to jobs within certain occupations (Carbonaro 2007). However,

I also hypothesize that people who took more rigorous coursework may end up in better jobs *within* their occupations, regardless of their occupation's characteristics.

Table 4.5 presents select AMEs from analyses predicting bad job characteristics at midlife for all women and men, controlling for degree attainment in Model 1 and adding occupational characteristics in Model 2 for each outcome. The characteristics are first modeled separately to estimate the relationship between the corresponding occupational and job characteristics. For each job characteristic, Model 1 shows a significant protective estimated effect of math for women (but not men), either through taking at least Algebra 2 or having higher math test scores. One exception is that women with higher test scores are more likely to work part-time, which may be due to my inability to identify voluntary part-time workers in the outcome measure. After accounting for the corresponding occupational characteristics, I only see an independent protective relationship between math test scores and low wages for women and a slight benefit of advancing to Algebra 1 for men in terms of avoiding jobs without retirement plans.

As I would expect, each occupational characteristic is highly predictive of being in a job with that characteristic. For instance, on average and net of controls, women in occupations with low availability of retirement benefits are 35 percentage points more likely to hold a job that does not offer retirement benefits. In the last set of models in Table 4.5, I predict the number of bad job characteristics for women and men. The results reveal that net of background and high school preparation, college degree attainment is associated with fewer bad job characteristics for men but not women. In contrast, having advanced to Algebra 2 or above in high school is linked to fewer bad job characteristics for women. Further, a college degree does not offer significant protection to women against *any* of the bad job characteristics, but a bachelor's degree significantly protects men against all except part-time jobs. Although previous results suggest that a bachelor's degree can help keep women out of the worst *occupations*, it may be college-preparatory math coursework that helps women avoid bad *jobs* within their occupational context.

Table 4.5. AMEs from Logistic Regressions Predicting Bad Job Characteristics and AMEs from Poisson Regressions Predicting Number of Bad Job Characteristics at Midlife

	Women			
	Parttime job		No retirement plan offered	
	Model 1	Model 2	Model 1	Model 2
College degree	-0.028	-0.009	0.012 †	0.047 †
	(0.021)	(0.021)	(0.040)	(0.037)
High proportion of involuntary part-time workers in occupation		0.225*** † (0.015)		
Low availability of retirement benefits in occupation				0.351*** (0.036)
Low-wage occupation				
# Bad occupational characteristics				
Highest math course in high school (ref: < Algebra 1)				
Algebra 1	0.002	0.021	-0.000	0.040
	(0.028)	(0.026)	(0.053)	(0.052)
Geometry	-0.021	0.002	0.033	0.066
	(0.032)	(0.032)	(0.052)	(0.051)
Algebra 2 or above	-0.063* †	-0.047	-0.109*	-0.083
	(0.026)	(0.025)	(0.046)	(0.046)
12th grade math test score (std.)	0.031*	0.047**	0.009	0.019
	(0.015)	(0.015)	(0.028)	(0.027)
n	4,310		1,850	

† indicates a statistically significant gender difference in coefficients

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

(Standard errors in parentheses)

All models include the following covariates: highest science course taken in high school, whether respondent took honors English, number of foreign language credits, weighted core academic GPA, locus of control, race/ethnicity, parental education, parental income, family structure, high school urbanicity, South residence in high school, high school sector, and whether a respondent has worked in the past 5 years

Table 4.5, *continued*

	Women			
	Low wages		# Characteristics	
	Model 1	Model 2	Model 1	Model 2
College degree	-0.068	-0.033	-0.092	0.029 †
	(0.037)	(0.036)	(0.069)	(0.073)
High proportion of involuntary part-time workers in occupation				
Low availability of retirement benefits in occupation				
Low-wage occupation		0.194***		
		(0.029)		
# Bad occupational characteristics				0.207*** †
				(0.017)
Highest math course in high school (ref: < Algebra 1)				
Algebra 1	-0.035	-0.018	-0.046	-0.015
	(0.041)	(0.038)	(0.091)	(0.081)
Geometry	0.025	0.045	0.062	0.126
	(0.049)	(0.050)	(0.128)	(0.135)
Algebra 2 or above	0.005	0.018	-0.226*	-0.187*
	(0.047)	(0.047)	(0.090)	(0.089)
12th grade math test score (std.)	-0.076** †	-0.068** †	-0.032	-0.004
	(0.024)	(0.024)	(0.052)	(0.054)
n	1,470		1,470	

† indicates a statistically significant gender difference in coefficients

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

(Standard errors in parentheses)

All models include the following covariates: highest science course taken in high school, whether respondent took honors English, number of foreign language credits, weighted core academic GPA, locus of control, race/ethnicity, parental education, parental income, family structure, high school urbanicity, South residence in high school, high school sector, and whether a respondent has worked in the past 5 years

Table 4.5, *continued*

	Men							
	Parttime job		No retirement plan		Low wages		# Characteristics	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
College degree	-0.013	-0.005	-0.154***	-0.120**	-0.104**	-0.086**	-0.243***	-0.231***
	(0.012)	(0.012)	(0.038)	(0.039)	(0.033)	(0.032)	(0.068)	(0.066)
High proportion of involuntary part-time workers in occupation		0.092***						
		(0.011)						
Low availability of retirement benefits in occupation				0.301***				
				(0.038)				
Low-wage occupation						0.157***		
						(0.023)		
# Bad occupational characteristics								0.149***
								(0.016)
Highest math course in high school (ref: < Algebra 1)								
Algebra 1	0.003	0.000	-0.087	-0.102*	-0.005	-0.005	-0.059	-0.068
	(0.015)	(0.014)	(0.053)	(0.048)	(0.033)	(0.032)	(0.077)	(0.070)
Geometry	-0.026	-0.027	0.031	0.041	0.000	0.016	0.015	0.045
	(0.015)	(0.015)	(0.062)	(0.061)	(0.040)	(0.041)	(0.092)	(0.094)
Algebra 2 or above	0.006	-0.001	-0.069	-0.084	-0.020	-0.019	-0.040	-0.051
	(0.014)	(0.014)	(0.051)	(0.049)	(0.035)	(0.034)	(0.080)	(0.077)
12th grade math test score (std.)	-0.009	-0.004	-0.010	-0.005	0.001	0.013	-0.039	-0.011
	(0.009)	(0.009)	(0.029)	(0.027)	(0.021)	(0.021)	(0.046)	(0.046)
n	3,700		1,540		1,350		1,350	

Table 4.6 presents the same models for only respondents without a college degree. Across outcomes, women who took more advanced math courses or had higher math test scores in high school are less likely to have bad job characteristics at midlife. In contrast to the education-pooled sample, math coursework or test scores remain significant predictors of bad job characteristics after controlling for the corresponding occupational characteristics among women without bachelor's degrees. In addition, men without college degrees receive significant protection from higher levels of math against part-time jobs and jobs without retirement plans. This suggests that even within occupations with more bad jobs, workers who have a stronger high school math background may be better off. However, I only find a significant association between math coursework and the *number* of bad job characteristics for women. Together, the results from Tables 4.5 and 4.6 suggest that more rigorous math coursework lowers both women's and men's odds of having jobs with certain bad characteristics, at least to some extent, but may only protect against the clustering of bad job characteristics for women.

Table 4.6. AMEs from Logistic Regressions Predicting Bad Job Characteristics and AMEs from Poisson Regressions Predicting Number of Bad Job Characteristics at Midlife Among Men and Women without a College Degree

	Women							
	Parttime job		No retirement plan		Low wages		# Characteristics	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
High proportion of involuntary part-time workers in occupation		0.204*** (0.019) †						
Low availability of retirement benefits in occupation				0.352*** (0.039)				
Low-wage occupation						0.239*** (0.039)		
# Bad occupational characteristics								0.223*** (0.021)
Highest math course in high school (ref: < Algebra 1)								
Algebra 1	0.022	0.036	-0.018	0.017	-0.083	-0.057	-0.110	-0.089
	(0.030)	(0.029)	(0.059)	(0.057)	(0.055)	(0.050)	(0.112)	(0.095)
Geometry	-0.010	0.012	0.126	0.159*	0.012	0.043	0.229	0.305
	(0.042)	(0.043)	(0.067)	(0.065)	(0.076)	(0.077)	(0.186)	(0.206)
Algebra 2 or above	-0.089** †	-0.073*	-0.156**	-0.120*	-0.007	0.018	-0.325*	-0.282*
	(0.030)	(0.030)	(0.060)	(0.060)	(0.076)	(0.075)	(0.129)	(0.130)
12th grade math test score (std.)	0.024	0.039* †	-0.009	0.008	-0.095** †	-0.081* †	-0.100	-0.049
	(0.020)	(0.018)	(0.038)	(0.037)	(0.033)	(0.033)	(0.073)	(0.075)
n	2,460		900		670		670	

† indicates a statistically significant gender difference in coefficients
*** p<0.001, ** p<0.01, * p<0.05
(Standard errors in parentheses)

Table 4.6, *continued*

	Men							
	Parttime job		No retirement plan		Low wages		# Characteristics	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
High proportion of involuntary part-time workers in occupation		0.098***						
		(0.014)						
Low availability of retirement benefits in occupation				0.368***				
				(0.046)				
Low-wage occupation						0.230***		
						(0.032)		
# Bad occupational characteristics								0.211***
								(0.020)
Highest math course in high school (ref: < Algebra 1)								
Algebra 1	0.009	0.007	-0.089	-0.102	0.002	0.007	-0.041	-0.038
	(0.018)	(0.017)	(0.066)	(0.058)	(0.049)	(0.047)	(0.105)	(0.092)
Geometry	-0.043*	-0.045*	-0.005	0.020	-0.030	-0.011	-0.063	-0.014
	(0.017)	(0.018)	(0.080)	(0.076)	(0.053)	(0.054)	(0.123)	(0.125)
Algebra 2 or above	-0.000	-0.009	-0.143*	-0.169**	-0.011	-0.012	-0.094	-0.118
	(0.021)	(0.020)	(0.070)	(0.064)	(0.057)	(0.052)	(0.120)	(0.109)
12th grade math test score (std.)	-0.013	-0.007	-0.020	-0.016	-0.006	0.013	-0.086	-0.051
	(0.012)	(0.012)	(0.039)	(0.036)	(0.032)	(0.031)	(0.068)	(0.066)
n	2,190		800		670		670	

*** p<0.001, ** p<0.01, * p<0.05
(Standard errors in parentheses)

All models include the following covariates: highest science course taken in high school, whether respondent took honors English, number of foreign language credits, weighted core academic GPA, locus of control, race/ethnicity, parental education, parental income, family structure, high school urbanicity, South residence in high school, high school sector, and whether a respondent has worked in the past 5 years

Within- and Between-Group Inequalities in Perspective

Collectively, my results suggest that the importance of workers' academic preparation for their resilience in the long-run labor market is shaped by nested layers of inequality – differential access to segments of the labor market, occupations within segments, and jobs within occupations. My final analyses bring the segments of the labor market together to examine within-gender inequalities in the context of between-gender inequalities across these structural layers. In Figures 4.2 and 4.3, I first present average predicted counts of workers' bad occupational characteristics (Fig. 4.2) and average predicted counts of workers' bad job characteristics, controlling for the number of bad characteristics associated with their occupations (Fig. 4.3).[8] I compare workers based on whether they took Algebra 2 or above for ease of comparability across groups, and it approximates a college-preparatory math curriculum for this cohort.

[8] I ran separate analyses for each sub-group based on equations from Table 4.3 (Model 1) and Table 4.6 (Model 2 for Number of Job Characteristics).

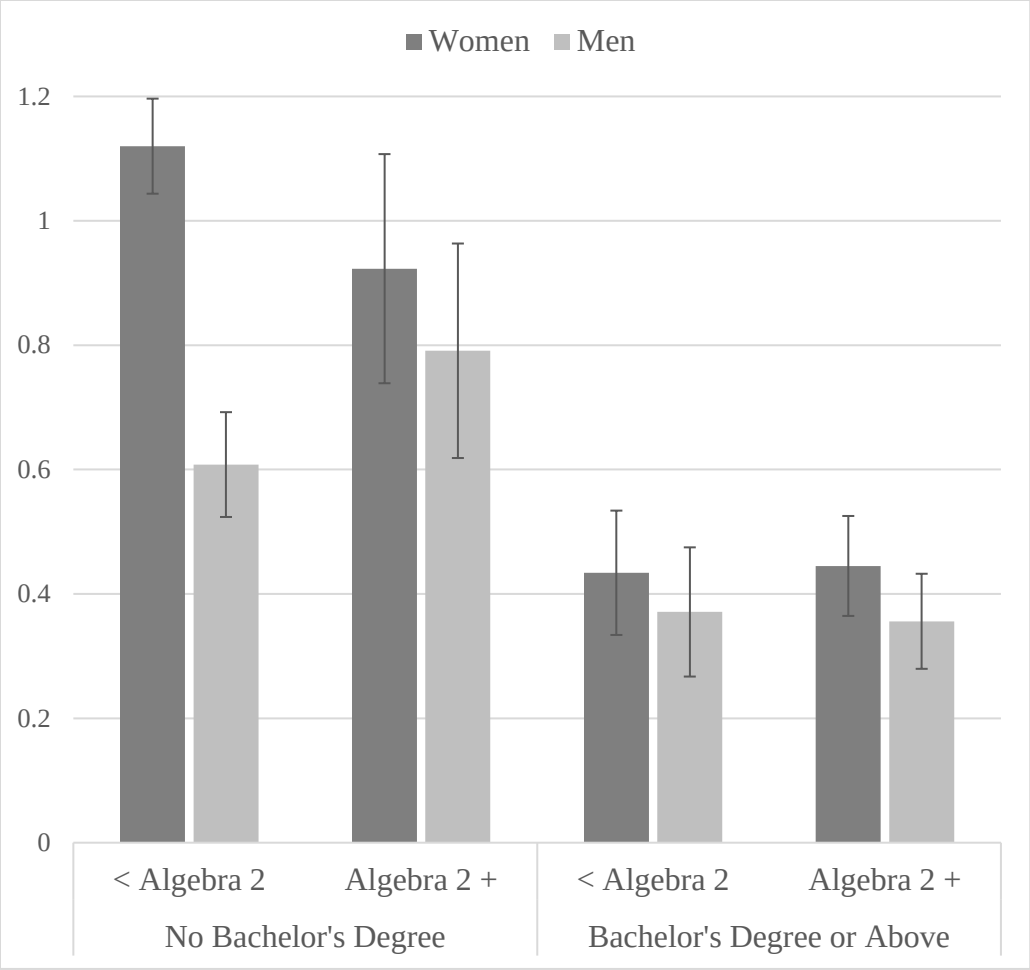


Figure 4.2. Average Predicted Counts from Baseline Model of Bad Occupational Characteristics at Midlife, by Degree Attainment, Gender, and College-Preparatory Math Course-taking

Notes: Predictions calculated from separate models by gender and educational attainment, including all covariates in Table 4.3, Model 1

In Figure 4.2, I can see that the gender gap in the number of bad occupational characteristics is concentrated mainly among people without college degrees who did not take college-preparatory math courses in high school. Looking at the average predicted counts for all groups side by side emphasizes how boundaries in the labor market shape the relationship between academic preparation and occupational outcomes, as I can see the differential patterns across structural divides. A college degree insulates people from the worst occupations,

regardless of workers' characteristics. However, for workers without the benefit of a bachelor's degree, I see not only a gender gap but also gender-divergent relationships between math coursework and occupational quality. If I aggregate these sub-groups together, the overall average predicted gap between all men and all women is about .13 bad occupational characteristics (see Figure A1), but the gap among women based on whether they took Algebra 2 is .33 bad characteristics (compared to .07 among men).

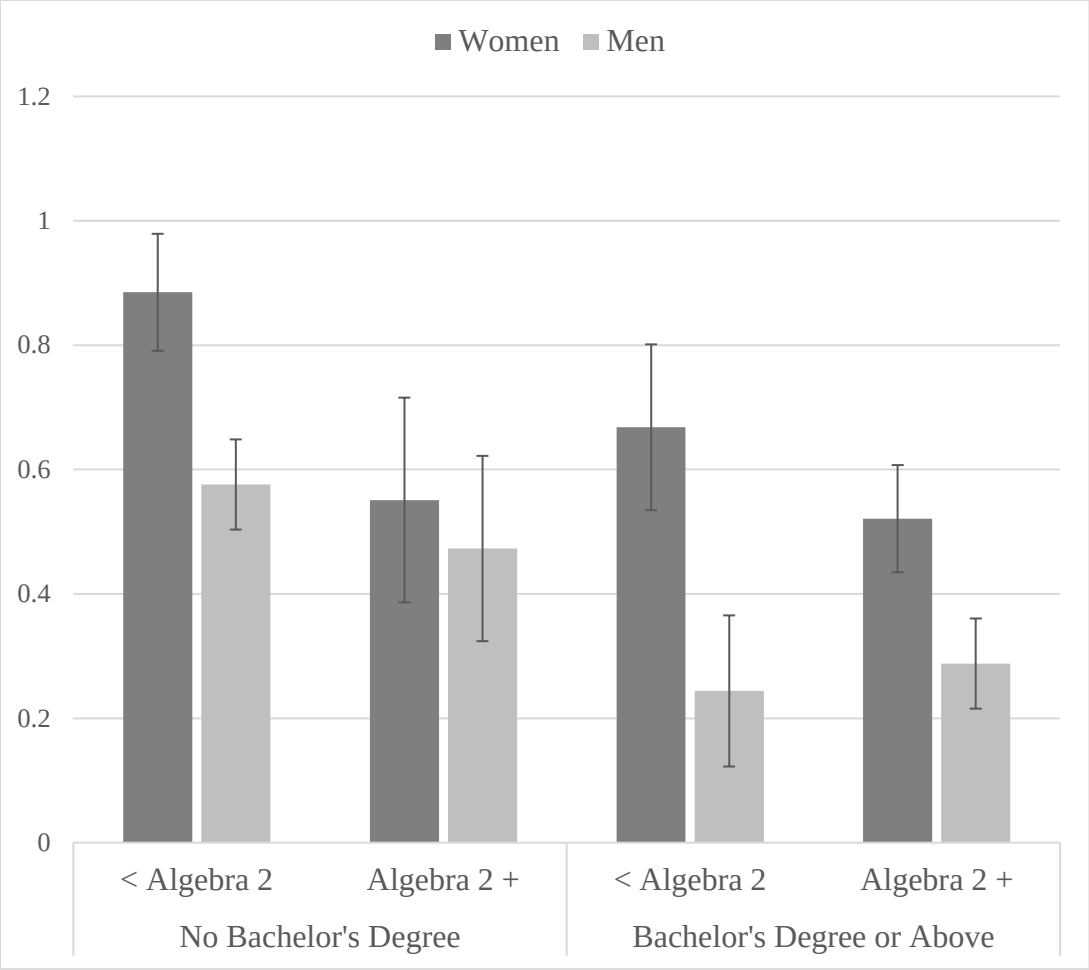


Figure 4.3. Average Predicted Counts of Bad Job Characteristics at Midlife, Controlling for Number of Bad Occupational Characteristics, by Degree Attainment, Gender, and College-Preparatory Math Course-taking

Notes: Predictions calculated from separate models by gender and educational attainment, including all covariates in Table 4.6, Model 2 for the number of bad job characteristics

Figure 4.3 shows predicted counts for bad job characteristics, controlling for the number of bad occupational characteristics, which allows the predicted counts to be interpreted as the comparison of jobs within similar occupational risk contexts. The patterns among workers without a college degree resemble those I saw for occupational characteristics, but now I also see a gender gap among college-educated workers that persists across levels of math preparation. Ancillary analyses indicate that these patterns are consistent for college-educated workers even if I exclude part-time hours from the count measure or predict low wages alone, implying that the

gender gap is likely not a result of college-educated women voluntarily entering more flexible employment arrangements and forgoing access to benefits. If I again aggregate the sub-groups, the average predicted gap between men and women is .18 bad job characteristics (see Figure A2), and the gap among women based on whether they took Algebra 2 is .29 bad characteristics (.15 for men). Together, the aggregate patterns for bad occupational and job characteristics highlight the disadvantages women face at the bottom of the labor market, which tend to be masked by a focus on average gender differences.

Consistent with research suggesting that jobs are growing more precarious for all workers, I see that bad jobs exist across the occupational spectrum (Kalleberg 2011). However, I also see that women are generally at greater risk of working in bad jobs, especially if they did not take college-preparatory math in high school. In sum, my findings suggest that more rigorous math coursework may provide a long-run safety net to women in the labor market, even and especially if they do not attain a bachelor's degree. The differences within groups and across outcomes in my analyses demonstrate the nuances of gender inequality and the benefit of incorporating multiple layers of inequality into examinations of gender gaps in the labor market.

DISCUSSION

The shifting of risk and economic burdens from employers to employees, coupled with rising occupational polarization, has led to greater prevalence of and heightened consequences for individuals who hold more disadvantaged positions in the U.S. labor market. Using longitudinal data, my results suggest that more advanced academic preparation in high school can reduce workers' exposure to bad jobs later in life. Rigorous math courses in high school may provide a safety net in the long-run labor market for students who do not complete college, though I found greater and more consistent estimated effects for women than for men. Women who took higher levels of math coursework in high school were less likely to end up in the worst occupations and jobs over 30 years later, even net of college degree attainment.

The relationship between academic preparation and exposure to bad jobs later in life is shaped by workers' occupational opportunities. I saw that workers with college degrees are largely insulated from occupations with the highest incidence of bad jobs. This underscores college degree attainment as the focal mechanism through which academic preparation can help students stay afloat in the long-run labor market, by granting workers access to higher occupational strata (Carbonaro 2007). In addition to the advantages of a college degree, I found that it was women *without* bachelor's degrees who realized the greatest benefit of math coursework due largely to women's gendered occupational opportunities in the sub-baccalaureate labor market. For instance, about 70% of men but only 15% of women without college degrees in my sample were in male-dominated occupations, which tend to have the fewest bad characteristics (Table 4.1). However, because women's sub-baccalaureate occupations vary considerably in terms of quality and skill demands, women who took more rigorous math courses could avoid ending up in the worst occupations later in life.

My analyses revealed that women who took higher levels of math coursework had better-quality occupations because they tended to work in occupations with higher skill demands, not because they were more likely to work in male-dominated occupations. This is consistent with England's (2010) expectation that women only cross gender barriers into male-dominated occupations when better female-typical jobs are not available. Women who took more advanced math coursework, and ostensibly had broader opportunities than other women, were no more likely than other women to end up in male-dominated occupations, even though male-dominated occupations are of greater average quality. In fact, my results in Table 4.3 suggested that women without a college degree in male-dominated occupations experienced about 1.5 fewer bad occupational characteristics than women in female-dominated occupations. For context, women with a college degree had .41 fewer bad occupational characteristics than women without a college degree (Table 4.2).

Among women without a college degree, occupational math knowledge demands explained about 45% of the association between college-preparatory math coursework in high

school and bad occupational characteristics. These results are consistent with other studies that have found advanced math coursework leads to higher earnings, likely by helping people develop skills that are in demand in the labor market (Adkins and Noyes 2016; Dolton and Vignoles 2002; Joensen and Nielsen 2009). After accounting for occupational math knowledge demands, the relationship between coursework and bad occupational characteristics was attenuated to marginal significance, but college-preparatory math coursework remained significantly more important for women's occupational quality than for men's.

I also found that math helped women avoid working in bad jobs *within* their occupational contexts. Therefore, even if women ended up in occupations with a higher prevalence of bad jobs, those who took higher levels of math or had higher math achievement test scores were less likely to actually be employed in bad jobs. Coursework did not generally predict bad occupational characteristics for men, but I did find that more rigorous math preparation may reduce men's odds of working part-time or having a job with no retirement plan, particularly men without a college degree. Further, I saw that a college degree provided a significant advantage to men but not women in terms of bad job characteristics. Though men and women with college degrees were similarly able to avoid bad occupations in the long run, the women ended up in significantly worse jobs. This aligns with Levanon and Grusky's (2016) proposition that when gender integration is achieved at a broader occupational level, gender essentialist beliefs will generate more fine-grained gender segregation at more detailed occupational levels, sorting men and women into different kinds of jobs or specialties.

I saw that, as with other measures of education, women need "more" math preparation than men to achieve anything resembling gender parity in exposure to bad jobs at midlife. Though I cannot know exactly why higher levels of math coursework are associated with better occupations and jobs for women, my findings suggested that more advanced math courses foster or reflect skills that go beyond students' math content-specific skills. Because employers are not likely to look at high school transcripts, it is improbable that employers have a signal of the math courses workers took, unless the workers specifically mention their coursework in certain

subjects (Bishop 1989; Rose and Betts 2001). Further, these students took the courses before dramatic shifts in the labor market had occurred, so it unlikely that they anticipated needing the courses for the impending changes and strategically invested in or signaled this coursework to employers. Thus, it is more plausible that students who took more rigorous courses have higher levels of skills that align with labor market demands or improve their general on-the-job learning and work performance. I cannot be certain that this relationship is causal and not due to unobserved selection factors unrelated to math, but it is notable that math coursework and test scores remain significant predictors in models that control for a host of background and school factors, GPA, locus of control, and other rigorous coursework (see Rose and Betts 2001). In addition, the results were consistent across multiple robustness tests, including school-fixed effects, coarsened exact matching, propensity score matching, and inverse probability weighting. Further, previous research using instrumental variable methods suggests that the relationship between math coursework and labor force outcomes appears to be causal (Goodman 2012; Joensen and Nielsen 2009).

My results showed that more rigorous math coursework may help women without college degrees enter better occupations compared to *other women*. However, it was differences in the quality of male- and female-dominated occupations among workers without a college degree that explained the gap between men and women. This suggests that the processes driving within- and between-gender inequalities are distinct, largely due to gendered occupational opportunities and corresponding skill demands. Because men's sub-baccalaureate occupations tend to have better compensation than women's occupations and more manual skill demands, it may be that men's occupations are more susceptible to other dimensions of bad jobs not included in my measure. Mid-skilled jobs for men in blue-collar occupations were hit harder by deindustrialization and the Great Recession, whereas mid-skilled jobs for women in healthcare occupations are on the rise. In fact, ancillary analyses suggest that men without college degrees are more likely to be in occupations that have high rates of unemployment, are susceptible to computerization (Frey and Osborne 2017), and have high risk of occupational injuries. Further, historically strong unions

have insulated male-dominated industries from some of the trends that are eroding employment relations in other industries. If these unions weaken or disappear, it is possible that men's sub-baccalaureate occupations may begin to resemble women's in terms of the prevalence of bad jobs and the patterns of within-gender occupational inequality.

Though my main analyses focused on estimating processes of within-gender inequality, I also considered how these findings fit within the broader context of gender inequality in the labor market (McCall 2000). Better skills and preparation may help women avoid the worst occupations and jobs in the long run, but women overall are still significantly disadvantaged in the labor market compared to men, for reasons that may be less easily remedied. However, in terms of bad occupational and job characteristics, the average predicted gaps between women who took college-preparatory math coursework and those who did not were greater than the gaps between all women and all men. This is somewhat encouraging, in that academic preparation in high school is relatively malleable through policy intervention. Thus, a focus on targeting educational inequalities, especially in STEM, may be more effective in terms of addressing long-term gender inequality in workers' economic security by giving women a boost.

Like other research on job quality, my study was limited by available data (Findlay, Kalleberg, and Warhurst 2013), both in terms of the job characteristics the CPS and ACS surveys included and the extent to which the characteristics could be meaningfully aggregated to the occupation level. Ideally, my measure of bad jobs would also account for the prevalence of contingent and alternative work arrangements, a growing source of instability and underemployment among U.S. workers, but the Contingent Worker Supplement to the CPS was not available from 2006 to 2016. Further, my measures of health and retirement benefits only accounted for the availability of those benefits, not the type or extent of benefits offered by the employer. Despite data limitations, occupations are a central component in understanding workers' risks of exposure to bad jobs, especially as occupations have become more salient in explaining differences among workers over time (Mouw and Kalleberg 2010; but see Sakamoto

and Wang 2017). My study is not intended to be an exhaustive inquiry but rather an attempt to empirically incorporate structural labor market boundaries into the research on bad jobs.

Detailed employer data would provide more nuanced assessments of economic risks, as trends in employee benefits over recent decades indicate that burdens are shifting to employees, not that the benefits are disappearing completely. For instance, the percentage of workers covered by retirement plans at their jobs remained relatively stable from 1989 to 2007, though the percentage of workers with *only* defined contribution plans, such as a 401(k), increased from 35% to 64% (Sabelhaus and Schrass 2009). Defined contribution plans place the onus of saving for retirement on employees, and recent research has shown that more educated workers are more likely to participate and also contribute more of their earnings (Tamborini and Kim 2017). Thus, it is possible that the relationships I observe between academic preparation and workers' risks of bad jobs may hold or even strengthen if a more detailed measure of economic burdens was available. Though my analyses employed rich data on high school coursework and skills, I could not identify the exact mechanisms driving the relationship between math coursework and workers' exposure to bad jobs at midlife. Detailed information on individuals' job experiences could help elucidate how the skills or other advantages related to rigorous math preparation are of benefit in the labor market.

Chapter 5: Subjective Economic Insecurity at Midlife: Navigating an Unpredictable Social World

In Chapters 3 and 4, I investigated how individuals' academic preparation and skills in high school predict two vital dimensions of economic insecurity at midlife – labor force attachment and occupational precarity. The focus on these outcomes is in large part predicated on the assumption that workers' attachments to and places within the labor market are inherently tied to their current and future economic situations. In this chapter, I will empirically test this presumed connection by incorporating the outcomes from the previous chapters into an examination of individuals' subjective economic insecurity. In Chapters 3 and 4, I found that course-taking and skills in high school predicted the two objective measures of economic insecurity over 30 years later. I build on these findings to elucidate the role these measures play in people's subjective economic insecurity and how pre-labor market coursework and skills may be related both through and independent of labor market experiences.

Scholars have long focused on income and occupational attainment to increase our understanding of economic inequality, and research has increasingly turned toward more holistic indicators of individuals' economic situations such as wealth and economic insecurity (See Keister and Moller 2000; Killewald, Pfeffer, and Schachner 2017; Western et al. 2012). Focusing on these comprehensive measures allows for a more nuanced assessment of economic wellbeing and disparities because they account for processes beyond the labor market that shape men's and women's actual economic conditions. Undoubtedly, economic insecurity is closely tied to people's income and wealth, but it also reflects access to financial safety nets in the form of social and institutional relationships, and knowledge and preferences regarding financial management in times of need. The complex nature of economic insecurity introduces possible sources of heterogeneity among individuals who may have otherwise similar objective socioeconomic positions.

A wealth of research has established that adult characteristics like educational attainment, marital status, and income predict economic wellbeing. Early-life factors are less well-known, partly because the surveys traditionally used to study middle-aged individuals' finances and retirement preparation only reach respondents as adults. Individuals' economic insecurity at midlife is a snapshot of their financial situation at that point in time, but that situation is an accumulation of a lifetime of experiences and decisions (Killewald et al. 2017). Thus, it is worth considering a longer view of economic insecurity at midlife by incorporating earlier characteristics that influence peoples' financial experiences and decisions across the life course (see Halpern-Manners et al. 2015). This also means recognizing that people navigate their lives within structural contexts, which carry different risks and opportunities and ultimately shape the relationship between individuals' characteristics and their economic outcomes, as previous chapters have shown. This chapter builds on the framework constructed in previous chapters to investigate how people's early characteristics relate to subjective economic insecurity at midlife, with attention to variation in these relationships across and within social contexts, by gender, educational attainment, and marital status.

BACKGROUND

Subjective Economic Insecurity

Economic insecurity is a broad and malleable phrase that can be defined and measured in myriad ways, but the unifying characteristic is *insecurity*. The concept of insecurity is rooted in the unpredictability of daily life and the risk of economic loss that people face as they navigate the social world (Western et al. 2012). Unlike other economic indicators such as income, occupations, or even wealth, economic insecurity does not focus on measuring *levels* of socioeconomic status or inequality. Though economic insecurity may often coincide with socioeconomic status, it does not depend on it. Instead, insecurity depends on the risk of change in circumstances and the ability to cope with that change.

Economic insecurity can be examined objectively through measures such as income volatility, or it can be assessed subjectively through an individual's perceptions of their financial situation. In this chapter, I focus on subjective economic insecurity as a person's perceived ability to weather a short-term financial shock – specifically how confident they are that they could come up with $2,000 in the next month. Such modest short-term financial shocks could mean a brief spell of unemployment, an emergency room visit, or an unexpected car or home repair; any of these could cause serious and far-reaching damage to someone who does not have the means to deal with them.

Whether a person can come up with funds to weather a short-term financial shock is arguably contingent on an array of factors, though personal savings may be the most obvious source. However, a person's economic security also depends on their income, debt, expenses, formal and informal dependents, assets and liquidity, availability of credit and credit history, financial knowledge, spending habits, and social ties. In fact, when asked how they would cope with a short-term financial shock, the majority of people do say they might use some form of savings (~60%), but people indicate a variety of ways in which they might meet a financial need (Lusardi, Schneider, and Tufano 2011). About one-third (34%) of people say they might borrow from friends or family, and thirty percent (30%) say they might use mainstream credit such as a credit card. Close to one-quarter of people say they would work more (23%), roughly twenty percent would consider selling possessions (19%), and about ten percent (11%) might turn to alternative forms of credit such as pawning possessions. These coping methods were not mutually exclusive, so people have alternate methods or even a combination of these sources in mind when thinking about their ability to weather a shock.

Knowledge, Skills, and Psychosocial Factors

Unsurprisingly, many explanations for variation in economic insecurity relate to people's financial knowledge and management. Financial literacy has often been cited as the most important factor contributing to economic insecurity (Lusardi and Mitchell 2014). Interestingly,

recent research has shown that math preparation, rather than financial education, may lead to greater financial literacy (Cole, Paulson, and Shastry 2016). Thus, we might expect that greater math skills and preparation should lower people's chances of economic insecurity. However, one study found that even highly-educated women have relatively modest financial literacy (Mahdavi and Horton 2014), suggesting the processes that lead to economic insecurity may differ by gender.

Financial literacy and general math skills are undoubtedly vital components of economic security and financial management more generally. Though, having the skills to manage their finances is only one piece of the puzzle; how people use those skills matters, as well. People's attitudes can help shape how they interact with the financial world. For instance, confidence, self-efficacy and risk aversion are related to financial behavior; people who are more self-efficacious or confident are less risk averse in their investments and more likely to use more financial products (Barber and Odean 2001; Estes and Hosseini 1988; Farrell, Fry, and Risse 2016; Jianakoplos and Bernasek 1998; Krueger and Dickson n.d.; Schubert et al. 1999). Previous research suggests that women are generally less self-efficacious and more risk averse than men (Farrell et al. 2016; Jianakoplos and Bernasek 1998), but one study questions that conclusion, arguing that "gender-specific risk behavior found in previous survey data may be due to differences in male and female opportunity sets rather than stereotypic risk attitudes" (Schubert et al. 1999:385).

Economic Insecurity in a Gendered Society

In general, women are less able to cope with financial shocks than men (Lusardi et al. 2011), and gendered opportunity structures across societal domains may differentially influence the relationship between men's and women's characteristics and their risks of financial insecurity. After all, people make decisions throughout their lives based in part on personal contexts and characteristics, which may or may not align with institutional contexts and demands for economic success. Considering the importance of dimensions of self-concept such as self-

efficacy or self-confidence for financial outcomes, early gender differences relating to self-concept may play a role in how men and women navigate their circumstances. Further, different dimensions of self-concept may matter more for men's or women's economic insecurity, as previous research has shown that men and women attach significance to different sources of self-esteem (Schwalbe and Staples 1991).

Women are less likely to be in the types of occupations that demand specific skills that may support financial stability, such as STEM and finance occupations. Further, women's subjective financial situation is shaped by gendered processes that go beyond the occupational sorting mechanisms that are crucial to my first two analytic chapters. Lingering gender essentialist ideologies across spheres of society hinder women's economic success and independence. Women face interruptions and constraints in their careers due to childbearing and the household division of labor, and early childbearing may be especially harmful to women's long-term economic wellbeing (Hofferth and Moore 1979). Men's roles as breadwinners and women's greater parental responsibilities mean that women generally face harsher economic consequences of divorce (Espenshade 1979; Peterson 1996; Smock, Manning, and Gupta 1999). However, this also means that a man's job loss may be more consequential for the household's financial situation than a woman's. Accounting for gendered processes outside of the labor market acknowledges that women and men are not only working in a gendered labor market; they are living in a gendered society.

The Role of a College Degree

Higher wages are obviously an important source of protection against economic insecurity, and a college degree is often seen as a prerequisite for success and security in today's economy. Results from the previous chapters have underscored the strong economic safety net provided by a college degree and access to better jobs. Yet the Great Recession showed that even the most advantaged individuals may be vulnerable to shocks, and a college degree is not guaranteed protection against economic insecurity. Indeed, recent research has shown that while

economic insecurity is most concentrated among those with the lowest education and incomes, middle-class Americans are remarkably vulnerable, with nearly 25% of households who make between $100,000 and $150,000 reporting they could not come up with $2,000 in 30 days (Lusardi et al. 2011). Considering trends in debt loads and cost of living in high-growth areas, even some higher-income individuals might have a hard time weathering a financial shock.

Though advantaged individuals are not completely protected against economic insecurity, it may be that the determinants of economic insecurity differ for people who obtain a college degree versus those without that credential. A college degree may act as an "equalizer" of sorts in diluting the influence of earlier factors such as family background or pre-college academic preparation (Hout 1988; Torche 2011), due either to selection or the value of the credential itself. Though these early characteristics may remain vital in protecting people without a bachelor's degree from economic vulnerability, psychosocial factors such as self-efficacy or a greater sense of personal control (Caplan and Schooler 2007) may prove stronger protections for college graduates. Because people without a college degree generally have lower incomes, I expect that factors relating to financial knowledge or sources of additional income, such as math skills and marriage, may be more important in protecting them from economic insecurity.

METHODS

Data and Sample

This chapter uses both the sophomore and senior cohorts of HS&B, whereas analyses in Chapters 3 and 4 were limited to the sophomore cohort because high school transcripts are only available for the sophomores. The transcripts provide detailed and accurate data on course-taking and grades, which allowed a more thorough examination of academic experiences in high school and how they relate to vital components of economic security later in life. However, the measure of subjective economic insecurity used in this chapter was only collected for a subsample of sophomores but is available for all seniors. By including the seniors in this chapter's analyses, I can maintain sufficient sample sizes when I stratify analyses by gender and educational

attainment. Because I include the outcomes from previous chapters in the analyses, I limit the sample to respondents for whom we have both employment status and code-able occupations. This results in a total sample size of about 9,740 (3,320 sophomores and 6,420 seniors).

Outcome Measure: Subjective Economic Insecurity

The outcome measure for all analyses is subjective economic insecurity at midlife, which reflects an individual's perception of their own economic precarity. For the corresponding survey item, respondents were asked the following: "How confident are you that you could come up with $2,000 in the next month if an unexpected need arose? Would you say that you could definitely, probably, probably not or definitely not come up with the money?" I use this measure as a continuous indicator of economic insecurity from 1, definitely, to 4, definitely not. Thus, an increase in the outcome responds to higher levels of *perceived* insecurity, which is a subjective assessment by the individual as to their ability to come up with the money. This subjectivity allows an estimation of economic insecurity from the point of view of the individual within their actual circumstances, considering their knowledge of and access to financial safety nets.

Independent Variables of Interest

Math skills and preparation. I use two measures to consider respondents' math-related skills and preparation in high school: highest math course taken and math test score. These variables are conceptually similar to the previous chapters, but they have been modified to accommodate the data available for the senior cohort. I measure highest math course using the transcripts for the sophomores and self-reports for the seniors. Because sophomores have both transcripts and self-reports, I assessed the correspondence between reported and actual course-taking and found that misreporting was more likely to occur in the intermediate levels of math – Algebra 1, Geometry, and Algebra 2. The survey questions for self-reported coursework asked whether students had taken "first year algebra" or "second year algebra", which may have caused confusion as to course titles and sequences. This explanation is further supported by the fact that

errors in reporting were less likely among students who either did not advance to algebra coursework or who took advanced levels of math above Algebra 2. Therefore, I aggregate math coursework into categories of "low" (below Algebra 1), "middle" (Algebra 1, Geometry, Algebra 2), and "high" (above Algebra 2) to reduce possible error in the self-reports while still preserving meaningful cutoffs in course sequences.

For math test scores, I only include test items that were common to the senior and sophomore surveys, which were derived from the National Longitudinal Study of the class of 1972 (Heyns and Hilton 1982). These test items were designed to assess basic cognitive ability in mathematics that is less susceptible to change, rather than curriculum-specific achievement. The measure is a count of the number of questions a student answered correctly (out of 18), which I standardize by cohort to a mean of 0 and standard deviation of 1.

Psychosocial factors. I examine multiple psychosocial measures from high school to tap different dimensions of self-concept that may influence decision-making processes, economic success, and interpersonal relationships. The measures are locus of control, a self-report of popularity, a self-report of whether others view respondent as unattractive, and self-perceived ability to complete college. All measures are from respondents' senior years of high school, to maintain comparability between cohorts. The first variable is locus of control; people with a more internal locus of control believe they have more control over what happens to them in their lives. This is closely tied to the idea of self-efficacy, which is known to lead to better financial management. In addition, people who feel they have more control over their lives may feel less helpless or defeated when thinking about coping with a financial shock, resulting in a persistence that may help them be more resilient in the face of adversity.

The next variable is a self-report of popularity, which I include as a measure of how respondents see themselves socially and to tap an aspect of positive self-esteem. It is also possible that this may relate to respondents' actual social adeptness, which may benefit them in navigating social and institutional relationships that can serve as supports in times of need. A third, related variable is a report of whether others perceive respondent as unattractive, which I

include as an aspect of negative self-esteem or self-deprecation; this serves as the counterpoint to popularity, or the positive aspect of self-esteem. I include this measure of "self-deprecation" because it may be that positive self-concept is beneficial or merely that particularly negative self-concept is detrimental, or both. Again, it is possible that if others do view respondent as unattractive, this may have an additional impact on their relationships and labor market success. My final measure of self-concept relates to the dimension of *academic* self-concept. I include a continuous measure of how confident respondents are in their ability to complete college (regardless of whether they actually planned to attend), with responses ranging from "yes, definitely" to "definitely not".

Adult Characteristics as Mediators or Moderators

Family formation. I incorporate family formation by including measures of marriage and childbearing, which are particularly important for women's economic insecurity. The first measure is a dummy indicator of whether a respondent is currently married at midlife. If a respondent indicated that they are divorced, separated, widowed, or have never been married, they are considered "unmarried." I choose this categorization to reflect household composition, in terms of resource-pooling and sharing of financial burdens with a spouse. My second measure of family formation is early childbearing, a known detriment to women's later economic wellbeing (Hofferth and Moore 1979). I consider early childbearing as having a child within four years of expected high school graduation, to account for childbearing that may have interfered with college completion.

Education, Work, and Health at Midlife. I account for respondents' midlife educational attainment, work experiences, and health to consider important contemporaneous determinants of economic insecurity at midlife and the extent to which earlier characteristics operate through them. As in previous chapters, I measure educational attainment as a dummy indicator of attaining a college degree by the midlife survey. I incorporate my findings from Chapter 3 by including a categorical measure of labor force attachment, which is a 2x2 interaction of whether

someone is currently working and whether they have ever had a long-term limiting condition, illness, or disability. I combine respondents with previous and current disabling conditions to account for economic effects from previous conditions, such as medical bills, lapses in employment, or occupational changes. A continuous measure of self-rated health (Poor=1, Excellent=5) is also included to account for general health status apart from any disabling conditions. To incorporate occupational economic benefits from Chapter 4, I use logged average occupational wages and the continuous index of non-wage benefits I detailed in the "Robustness Checks" in Chapter 4. This index is based on occupational measures of availability of health insurance, availability of retirement plans, and prevalence of involuntary part-time workers. I standardize the index to a mean of 0 and standard deviation of 1, with a higher number indicating better occupations.

Sociodemographic and School Covariates

All analyses include a host of controls to account for respondents' sociodemographic background and school characteristics. All control variables are measured in respondents' senior year of high school, regardless of cohort. The control variables include race/ethnicity, family income, family structure, parent education, disability in high school, school urbanicity, school sector, and South region.

ANALYTIC PLAN

I use ordinary least squares (OLS) regression to predict individuals' subjective economic insecurity at midlife. I conduct my analysis of subjective economic insecurity in three steps. First, I present descriptive profiles of the characteristics of the sample within each "level" of insecurity. Next, I conduct a series of separate regression models predicting subjective economic insecurity, stratifying the sample first by gender and then breaking gender down by college degree attainment. I use ancillary analyses of fully-interacted models to test and indicate significant differences across subsamples.

For each subsample, I present nested models to account for the complex and temporal nature of the relationships. All models control on sociodemographic and school controls. The first model includes math skills and preparation, and the next model adds psychosocial factors to account for more general attitudes or dispositions that may shape long-term economic wellbeing. Then, I introduce family formation, labor market experiences, and adult health in three separate models to ascertain how these significant aspects of adult life may explain the role of earlier skills and preparation. My final set of analyses considers the extent to which subjective economic security may be a household-level measure by testing interactions by marital status using the full stratified models, to assess whether people's individual characteristics matter less when they have a spouse. Because weights for the midlife follow-up were constructed separately for each cohort, I include cohort as a stratum to ensure the cohorts each remain nationally-representative.

Robustness Checks

I conducted a number of robustness checks to ensure that my results are not sensitive to my analytic decisions. First, I tested many regression strategies before ultimately deciding on OLS. Previous literature examining this outcome variable has dichotomized it by positive and negative responses, referring to it as "financial fragility" (Lusardi et al. 2011). My results remain similar when I dichotomize the outcome, either at that cutoff or by comparing "definitely" to any degree of uncertainty. Substantively, I wanted to preserve the full spectrum of the outcome variable to allow for more variation and use the full information available. Therefore, I also predicted models using ordered logistic regression, which again gave very similar results, but the distribution of the outcome variable on some of the subsamples violates the proportional odds assumption. In addition, I conducted thorough checks on my variable construction and model specification decisions to ensure model parsimony without loss of explanatory power.

RESULTS

Descriptive Statistics

Table 5.1 presents descriptive statistics for the entire analytic sample, overall and by level of subjective economic insecurity. About 63% of the sample indicates that they could definitely come up with $2,000 in the next month, and 8% say they definitely could not. The other 30% of the sample expresses some degree of uncertainty in their response. Comparing the average characteristics of individuals in each outcome category generally reveals the patterns one would expect. Consistent with previous research, women report greater insecurity than men, making up 63% of people who definitely could not come up with the money. For the majority of predictors, each level of insecurity is associated with greater disadvantage, reflecting largely linear relationships. One key exception is college degree attainment, which underscores the strong protection a college degree provides against economic insecurity. Of the respondents who could definitely come up with the money, almost 50% have college degrees; the proportion drops to less than 30% in the "probably" category. Though the trends across levels of insecurity are relatively consistent, heterogeneity exists within each category. For example, 13% of people who say they definitely *could not* come up with the money have college degrees, and 12% of the sample who say they definitely *could* are not working. The heterogeneity within categories coupled with largely consistent trends across predictors speaks to the complex nature of subjective economic insecurity.

Table 5.1. Weighted Means and Proportions, by Level of Subjective Economic Insecurity

		Could come up with $2,000 in the next month			
	Sample	**Definitely**	**Probably**	**Probably Not**	**Definitely Not**
N=9,740		0.63	0.21	0.09	0.08
College degree	0.39	0.48	0.28	0.19	0.13
Female	0.51	0.47	0.58	0.56	0.63
Knowledge and Skills in HS					
Highest math course					
<Alg 1	0.20	0.13	0.25	0.32	0.45
Alg1-Alg2	0.53	0.52	0.57	0.53	0.48
>Alg2	0.27	0.35	0.18	0.15	0.08
Math test score (std)	-.12	.10	-.33	-.54	-.83
	(1.00)	(.97)	(.96)	(.97)	(.80)
Locus of control (std)	.01	.13	-.11	-.25	-.42
	(.99)	(.94)	(1.00)	(1.05)	(1.03)
Others perceive as unattractive	0.14	0.13	0.15	0.19	0.18
Self-reported popularity	0.79	0.82	0.75	0.73	0.69
Ability to complete college (1 high - 5 low)	1.89	1.76	1.97	2.23	2.35
	(.99)	(.93)	(.99)	(1.16)	(1.05)
Family Formation					
Parent within 4 years of HS	0.16	0.12	0.19	0.28	0.30
Marital Status (midlife)					
Married	0.68	0.73	0.67	0.52	0.43
Divorced/Separated/Widowed	0.19	0.16	0.19	0.28	0.35
Never Married	0.13	0.11	0.14	0.19	0.22
Work and Health					
Labor force attachment					
Working, no disability	0.71	0.78	0.69	0.56	0.38
Not working, no disability	0.09	0.08	0.10	0.12	0.09
Working, disability	0.11	0.10	0.11	0.09	0.12
Not working, disability	0.10	0.04	0.11	0.23	0.41
Self-rated health (Excellent 5 - Poor 1)	3.64	3.86	3.50	3.12	2.79
	(1.00)	(.89)	(.97)	(1.10)	(1.14)

Table 5.1, *continued*		Could come up with $2,000 in the next month			
	Sample	**Definitely**	**Probably**	**Probably Not**	**Definitely Not**
Average occupational wages (logged)	3.25 (.55)	3.38 (.52)	3.14 (.52)	2.98 (.53)	2.85 (.45)
Non-wage benefits of occupation (std)	.05 (.84)	.15 (.81)	-.03 (.88)	-.16 (.88)	-.31 (.80)
Sociodemographic Background					
Race/Ethnicity					
Non-hispanic white	0.75	0.81	0.68	0.62	0.62
Black	0.11	0.07	0.17	0.19	0.21
Hispanic	0.10	0.09	0.11	0.16	0.14
Other	0.03	0.04	0.04	0.03	0.03
Disability in HS	0.10	0.08	0.10	0.17	0.14
Family Income in HS					
Lower tercile	0.37	0.29	0.44	0.50	0.62
Middle tercile	0.36	0.38	0.36	0.34	0.25
Upper tercile	0.27	0.33	0.20	0.16	0.13
Lived with both biological parents	0.72	0.74	0.68	0.68	0.68
Parent education					
<HS	0.11	0.08	0.14	0.16	0.18
HS	0.61	0.58	0.63	0.68	0.70
College+	0.29	0.34	0.23	0.16	0.12
High School Characteristics					
Urbanicity					
Suburban	0.49	0.52	0.43	0.42	0.43
Urban	0.21	0.18	0.24	0.29	0.28
Rural	0.30	0.29	0.33	0.29	0.30
Private school	0.10	0.12	0.09	0.06	0.04
South region	0.13	0.12	0.14	0.17	0.16

The Benefit of a College Degree

Table 5.2 presents the results from multivariable OLS regressions predicting subjective economic insecurity among all women. This education-pooled model allows an assessment of the importance of a bachelor's degree for women's economic wellbeing. Model 1 includes only pre-labor market variables, and we can see that both math test score and math course level are significantly predictive of later economic insecurity. Among the psychosocial factors, popularity

appears to provide strong protection against economic insecurity later in life. Popularity is a measure of how people see themselves socially and ties into an aspect of positive self-esteem. If people are socially adept or likeable, this could protect them in myriad ways, such as through better relationships or career success.

Model 2 accounts for educational attainment, and we see that a college degree significantly lowers women's levels of economic insecurity and explains about 40% of the effect of taking high-level math courses. In Model 3, both family formation measures show a significant relationship with economic insecurity for women, but they only slightly attenuate the benefit of a college degree. Consistent with research on other economic outcomes, marriage provides particularly strong protection to women – even more protection than a college degree. Model 4 adds work and health at midlife, which account for about 60% of the benefit of a college degree. However, even in the final model, multiple early and midlife factors remain significantly predictive of subjective economic insecurity for women. The benefit of a college degree was almost entirely explained by better labor market experiences, and it explained very little of the importance of the significant early factors.

Table 5.2. Coefficients from OLS Regressions Predicting Subjective Economic Insecurity at Midlife – All Women

N = 5,450	1	2	3	4
Skills and Psychosocial Factors				
Math test score (std)	-0.110***	-0.086**	-0.080**	-0.067*
	(0.029)	(0.029)	(0.029)	(0.027)
Math course level (ref: middle)				
Low	0.320***	0.301***	0.295***	0.191**
	(0.074)	(0.074)	(0.072)	(0.065)
High	-0.114**	-0.069	-0.066	-0.052
	(0.039)	(0.039)	(0.040)	(0.038)
Locus of control (std)	-0.039	-0.033	-0.032	-0.016
	(0.024)	(0.024)	(0.025)	(0.023)
Perceived as unattractive	-0.020	-0.003	-0.012	-0.042
	(0.067)	(0.067)	(0.068)	(0.065)
Popular	-0.229***	-0.223***	-0.206**	-0.189**
	(0.065)	(0.067)	(0.064)	(0.058)
Confidence in ability to complete college	0.065*	0.051	0.040	0.020
	(0.028)	(0.028)	(0.027)	(0.026)
Educational Attainment				
Bachelor's degree		-0.233***	-0.209***	-0.076
		(0.052)	(0.051)	(0.048)
Family Formation				
Early childbearing			0.185**	0.104
			(0.061)	(0.058)
Married			-0.335***	-0.278***
			(0.045)	(0.041)
Work and Health at Midlife				
Average occupational wages (logged)				-0.232***
				(0.041)
Non-wage benefits of occupation (std)				-0.042
				(0.027)
Labor force attachment (ref: working, no disability)				
Not working, no disability				-0.034
				(0.058)
Working, disability				-0.011
				(0.064)
Not working, disability				0.562***
				(0.090)

Table 5.2, *continued*	1	2	3	4
Self-rated health				-0.131***
				(0.027)
Sociodemographic and School Controls				
Race/ethnicity (ref: non-Hispanic white)				
Black	0.282**	0.289***	0.190*	0.152
	(0.087)	(0.087)	(0.089)	(0.084)
Hispanic	-0.017	-0.021	-0.049	-0.024
	(0.073)	(0.073)	(0.073)	(0.068)
Other race/ethnicity	-0.144	-0.132	-0.107	-0.062
	(0.090)	(0.091)	(0.089)	(0.076)
Family income (ref: middle tercile)				
Lower tercile	0.166**	0.174***	0.163**	0.124**
	(0.052)	(0.051)	(0.050)	(0.046)
Upper tercile	-0.100*	-0.084	-0.075	-0.073
	(0.044)	(0.044)	(0.043)	(0.040)
Parent education (ref: high school)				
Less than high school	0.091	0.076	0.059	0.046
	(0.086)	(0.085)	(0.083)	(0.077)
Bachelor's degree or above	-0.056	-0.009	-0.006	-0.009
	(0.041)	(0.042)	(0.042)	(0.039)
School urbanicity (ref: suburban)				
Urban	0.039	0.046	0.044	0.033
	(0.060)	(0.061)	(0.060)	(0.058)
Rural	0.015	0.011	0.023	0.016
	(0.048)	(0.048)	(0.047)	(0.044)
Disability in high school	0.095	0.096	0.077	0.031
	(0.073)	(0.071)	(0.071)	(0.067)
Lived with both biological parents	0.029	0.034	0.050	0.050
	(0.046)	(0.046)	(0.045)	(0.041)
South region	-0.024	-0.011	-0.026	-0.055
	(0.068)	(0.069)	(0.069)	(0.066)
Private school	-0.033	-0.011	-0.006	0.014
	(0.047)	(0.047)	(0.045)	(0.041)
Senior cohort	0.088*	0.063	0.064	0.100**
	(0.040)	(0.040)	(0.038)	(0.036)
Constant	1.583***	1.676***	1.869***	3.009***
	(0.105)	(0.106)	(0.114)	(0.202)
R-squared	0.163	0.173	0.201	0.290

*** p<0.001, ** p<0.01, * p<0.05
(standard errors in parentheses)

Table 5.3 presents similar models for men. In Model 1, the main early predictor of subjective economic insecurity for men is their math test score, which shows an effect size almost identical to that we saw for women. However, men do not seem to receive the same benefit from math course-taking as women, which coincides with findings from previous chapters. Men who report that they are unattractive experience greater subjective economic insecurity, which may be related to appearance or to higher levels of self-deprecation. Thus, women's subjective economic insecurity appears to be sensitive to positive aspects of self-esteem, whereas men's insecurity is correlated with negative aspects of self-esteem.

Adding college degree attainment in Model 2 explains very little of the association between the early factors and later insecurity. Model 3 shows that marriage is also protective for men, but early childbearing does not have a significant relationship to their economic insecurity. The final model accounts for work and health at midlife, which attenuate almost all other coefficients to non-significance. Men's adult health and work experiences explain almost 70% of the benefit they receive from a bachelor's degree, almost 60% of the benefit associated with marriage, and over 50% of the negative impact associated with perceived unattractiveness. As with women, a college degree guards against economic insecurity largely through stronger labor force attachment and higher-paying occupations.

Table 5.3. Coefficients from OLS Regressions Predicting Subjective Economic Insecurity at Midlife - All Men

N = 4,290	1	2	3	4
Skills and Psychosocial Factors				
Math test score (std)	-0.109***	-0.093***	-0.089**	-0.066**
	(0.028)	(0.028)	(0.028)	(0.025)
Math course level (ref: middle)				
Low	0.140	0.130	0.124	0.068
	(0.072)	(0.072)	(0.072)	(0.065)
High	-0.052	0.004	0.008	0.016
	(0.044)	(0.044)	(0.044)	(0.041)
Locus of control (std)	-0.038	-0.029	-0.027	-0.021
	(0.028)	(0.028)	(0.027)	(0.024)
Perceived as unattractive	0.151*	0.158**	0.151*	0.072
	(0.060)	(0.060)	(0.059)	(0.057)
Popular	-0.026	-0.020	-0.016	0.006
	(0.052)	(0.052)	(0.051)	(0.044)
Confidence in ability to complete college	0.055*	0.042	0.036	0.023
	(0.026)	(0.026)	(0.025)	(0.024)
Educational Attainment				
Bachelor's degree		-0.214***	-0.191***	-0.060
		(0.042)	(0.042)	(0.042)
Family Formation				
Early childbearing			0.128	0.056
			(0.075)	(0.068)
Married			-0.210***	-0.090*
			(0.046)	(0.041)
Work and Health at Midlife				
Average occupational wages (logged)				-0.199***
				(0.037)
Labor force attachment (ref: working, no disability)				
Not working, no disability				0.438***
				(0.109)
Working, disability				-0.037
				(0.058)
Not working, disability				0.702***
				(0.113)
Self-rated health				-0.123***
				(0.022)

Table 5.3, *continued*	1	2	3	4
Sociodemographic and School Controls				
Race/ethnicity (ref: non-Hispanic white)				
Black	0.282**	0.293**	0.246**	0.161*
	(0.095)	(0.093)	(0.091)	(0.077)
Hispanic	0.132	0.130	0.103	0.067
	(0.080)	(0.079)	(0.078)	(0.069)
Other race/ethnicity	-0.101	-0.086	-0.097	-0.076
	(0.077)	(0.077)	(0.077)	(0.078)
Family income (ref: middle tercile)				
Lower tercile	0.193**	0.190**	0.196***	0.190***
	(0.060)	(0.059)	(0.059)	(0.053)
Upper tercile	-0.018	-0.010	-0.016	-0.000
	(0.039)	(0.039)	(0.039)	(0.036)
Parent education (ref: high school)				
Less than high school	0.016	0.003	0.003	-0.045
	(0.075)	(0.075)	(0.074)	(0.069)
Bachelor's degree or above	-0.078*	-0.044	-0.043	-0.047
	(0.040)	(0.038)	(0.037)	(0.034)
School urbanicity (ref: suburban)				
Urban	0.133*	0.128*	0.115	0.075
	(0.061)	(0.060)	(0.059)	(0.056)
Rural	-0.016	-0.017	-0.019	-0.001
	(0.046)	(0.046)	(0.046)	(0.040)
Disability in high school	0.236**	0.243**	0.237**	0.150*
	(0.083)	(0.083)	(0.083)	(0.070)
Lived with both biological parents	0.095	0.103*	0.124*	0.112*
	(0.052)	(0.052)	(0.051)	(0.046)
South region	0.086	0.083	0.084	0.081
	(0.062)	(0.060)	(0.060)	(0.059)
Private school	-0.024	-0.003	0.001	0.008
	(0.044)	(0.043)	(0.043)	(0.043)
Senior cohort	-0.001	-0.014	-0.002	0.014
	(0.039)	(0.039)	(0.039)	(0.035)
Constant	1.182***	1.254***	1.373***	2.342***
	(0.097)	(0.100)	(0.108)	(0.177)
R-squared	0.156	0.166	0.179	0.295

*** p<0.001, ** p<0.01, * p<0.05
(standard errors in parentheses)

Within-Group Heterogeneity in Subjective Economic Insecurity

The previous analyses for women and men confirmed that a college degree is an important safety net against economic insecurity because it leads to better health and employment experiences. However, a college degree could not fully explain how skills and psychosocial factors were related to economic insecurity at midlife, indicating within-group heterogeneity among people with the same level of education. Because people with a college degree are at far less risk of economic insecurity, it may be that the processes that lead to greater insecurity differ for people with and without a college degree. Previous chapters have shown that the groups at greatest risk of poor outcomes stand to benefit most from skills that may help them avoid falling to the bottom. The following analyses apply this same lens to subjective economic insecurity and estimate separate models for men and women with and without a college degree.

Table 5.4 presents coefficients from gender-stratified models estimating subjective economic insecurity for women and men *without* a college degree. Model 1 shows that higher math test scores are protective for both men and women, emphasizing the importance of cognitive skills even for people without a college degree. Women's economic insecurity is also tied to their math course-taking, with those who failed to advance to algebra coursework experiencing greater insecurity. Because high levels of math operated mainly through degree attainment in the pooled model for women, it is perhaps unsurprising that they do not help women without a college degree. As in the pooled sample for women, Model 2 indicates that popularity is the only aspect of self-concept that significantly predicts economic insecurity for women without a college degree. For men, none of the psychosocial factors are significantly related to insecurity. The family formation measures in Model 3 underscore the importance of marriage for both women and men, but only women are significantly impacted by early childbearing.

Table 5.4. Coefficients from OLS Regressions Predicting Subjective Economic Insecurity at Midlife - Women and Men without a Bachelor's Degree

	Model 1		Model 2		Model 3		Model 4		
N = 3,090 women 2,410 men	Women	Men	Women	Men	Women	Men	Women		Men
Skills and Psychosocial Factors									
Math test score (std)	-0.138***	-0.170***	-0.124**	-0.148***	-0.121**	-0.142***	-0.089*		**-0.114*** **
	(0.038)	(0.039)	(0.040)	(0.040)	(0.040)	(0.040)	(0.038)		(0.034)
Math course level (ref: middle)									
Low	0.321***	0.108	0.295***	0.092	0.294***	0.087	0.182**		0.024
	(0.076)	(0.078)	(0.076)	(0.079)	(0.072)	(0.079)	(0.067)		(0.072)
High	-0.008	-0.024	0.009	-0.011	0.026	-0.003	**0.028**		0.018
	(0.075)	(0.077)	(0.075)	(0.077)	(0.078)	(0.077)	(0.073)		(0.071)
Locus of control (std)			-0.004	-0.004	0.004	-0.002	**0.021**		0.002
			(0.035)	(0.038)	(0.035)	(0.037)	(0.032)		(0.032)
Perceived as unattractive			0.049	0.160	0.042	0.154	0.018		0.078
			(0.101)	(0.083)	(0.101)	(0.082)	(0.097)		(0.076)
Popular			-0.161*	-0.049	-0.169*	-0.049	-0.161*	‡	-0.005
			(0.076)	(0.070)	(0.072)	(0.069)	(0.064)		(0.059)
Confidence in ability to complete college			0.046	0.050	0.026	0.039	0.003		0.022
			(0.033)	(0.030)	(0.031)	(0.030)	(0.029)		(0.028)
Family Formation									
Early childbearing					0.277***	0.152	**0.186** **		0.074
					(0.068)	(0.087)	(0.065)		(0.077)
Married					-0.434***	-0.260***	**-0.344*** **	‡	-0.103
					(0.061)	(0.062)	(0.055)		(0.055)

Table 5.4, *continued*	Model 1		Model 2		Model 3		Model 4		
	Women	Men	Women	Men	Women	Men	Women		Men
Work at Midlife									
Average occupational wages (logged)							**-0.265*** **		-0.255***
							(0.055)		(0.063)
Non-wage benefits of occupation (std)							**-0.639*** **		
							(0.163)		
Occupational Wages x Non-wage benefits							0.189***		
							(0.052)		
Labor force attachment (ref: working, no disability)									
Not working, no disability							-0.112	‡	0.447***
							(0.068)		(0.131)
Working, disability							-0.052		-0.047
							(0.091)		(0.077)
Not working, disability							0.544***		**0.751*** **
							(0.107)		(0.124)
Self-rated health							-0.135***		-0.145***
							(0.038)		(0.030)
Sociodemographic and School Controls									
Race/ethnicity (ref: non-Hispanic white)									
Black	0.301**	0.298*	0.335**	0.324**	0.182	0.254*	0.169		0.140
	(0.105)	(0.125)	(0.106)	(0.125)	(0.106)	(0.122)	(0.095)		(0.102)
Hispanic	0.027	0.124	0.035	0.158	-0.022	0.120	0.025		0.086
	(0.095)	(0.101)	(0.094)	(0.101)	(0.093)	(0.099)	(0.086)		(0.086)
Other race/ethnicity	-0.158	-0.138	-0.158	-0.145	-0.136	-0.167	-0.039		-0.163
	(0.140)	(0.116)	(0.143)	(0.114)	(0.141)	(0.115)	(0.112)		(0.111)

Table 5.4, *continued*	Model 1		Model 2		Model 3		Model 4	
	Women	Men	Women	Men	Women	Men	Women	Men
Family income (ref: middle tercile)								
Lower tercile	0.227**	0.232**	0.202**	0.230**	0.188**	0.246**	0.134*	0.233***
	(0.069)	(0.074)	(0.070)	(0.077)	(0.067)	(0.077)	(0.061)	(0.068)
Upper tercile	-0.081	-0.004	-0.077	0.008	-0.065	-0.008	-0.041	0.031
	(0.075)	(0.065)	(0.075)	(0.064)	(0.073)	(0.064)	(0.064)	(0.057)
Parent education (ref: high school)								
Less than high school	0.145	0.027	0.131	0.013	0.107	0.014	0.082	-0.050
	(0.097)	(0.088)	(0.096)	(0.088)	(0.092)	(0.087)	(0.086)	(0.080)
Bachelor's degree	0.054	-0.126*	0.057	-0.108	0.057	-0.103	0.063	-0.094
	(0.072)	(0.064)	(0.074)	(0.064)	(0.073)	(0.063)	(0.065)	(0.056)
School urbanicity (ref: suburban)								
Urban	0.011	0.199*	0.026	0.184*	0.030	0.159	0.005	0.118
	(0.076)	(0.088)	(0.075)	(0.088)	(0.072)	(0.088)	(0.068)	(0.081)
Rural	-0.003	0.017	0.008	0.008	0.024	0.010	0.015	0.030
	(0.069)	(0.066)	(0.068)	(0.066)	(0.066)	(0.068)	(0.062)	(0.059)
Disability in high school	0.178	0.378**	0.160	0.359**	0.140	0.359**	0.105	**0.236***
	(0.095)	(0.115)	(0.093)	(0.116)	(0.089)	(0.117)	(0.081)	(0.095)
Lived with both biological parents	0.055	0.125	0.050	0.116	0.076	0.148*	0.079	0.125*
	(0.060)	(0.073)	(0.060)	(0.072)	(0.060)	(0.072)	(0.055)	(0.062)
South region	-0.130	0.094	-0.127	0.110	-0.159*	0.107	-0.180*	0.115
	(0.076)	(0.085)	(0.075)	(0.086)	(0.077)	(0.085)	(0.071)	(0.085)
Private school	-0.088	0.023	-0.076	0.034	-0.065	0.044	-0.025	0.079
	(0.088)	(0.088)	(0.089)	(0.087)	(0.086)	(0.084)	(0.083)	(0.080)
Senior cohort	0.075	-0.019	0.081	-0.007	0.076	0.010	0.121*	0.037
	(0.057)	(0.056)	(0.057)	(0.058)	(0.055)	(0.058)	(0.050)	(0.051)

Table 5.4, *continued*	Model 1		Model 2		Model 3		Model 4	
	Women	Men	Women	Men	Women	Men	Women	Men
Constant	1.532***	1.287***	1.566***	1.192***	1.842***	1.345***	3.044***	2.535***
	(0.081)	(0.088)	(0.127)	(0.133)	(0.134)	(0.146)	(0.257)	(0.258)
R-squared	0.100	0.126	0.107	0.135	0.154	0.153	0.268	0.300

*** p<0.001, ** p<0.01, * p<0.05
(standard errors in parentheses)
Bolded coefficients are significantly different from same-gender peers with a college degree
‡ indicates a significant difference between the coefficients for women and men

Model 4 adds adult health and work experiences, and it also adds an interaction term between occupational wages and non-wage benefits for women without a college degree. I expected that, on average, non-wage benefits should have a larger impact on workers' economic insecurity in occupations with lower wages. The significance of the interaction term supports the expected relationship between wages and non-wage benefits for women without a college degree, but this interaction was not significant for any other subsamples. In fact, non-wage benefits in general are not significantly related to economic insecurity for men or for women with a college degree, so they are only included in the models for women without a degree. This discrepancy may be because, as shown in the previous chapter, women without a college degree are the ones clustered in the lowest-paying occupations. If women in worse occupations are also less likely to be married or to have spouses without benefits, then the availability of benefits becomes even more crucial to their economic insecurity.

The adult health and work measures account for about 40% of the detrimental effect of not advancing beyond low-level math courses for women and a modest portion of the benefit of higher math test scores for both men and women, though the measures remain statistically significant. In Chapters 3 and 4, I found that math skills and preparation were particularly important for women without a college degree in terms of their labor force attachment and occupational precarity. As expected, these two outcomes are significant predictors of subjective economic insecurity, but math skills and preparation protect women against economic insecurity even net of these important labor market factors. Though men do not receive the same protection from math coursework, they still benefit from higher math skills in the long run.

Model 4 also includes indicators of significant differences across subsamples. The "‡" symbol notes significant gender differences, and bolded coefficients indicate significant within-gender differences by college degree attainment. I tested for these differences in ancillary analyses using fully-interacted models. In terms of within-gender differences on the variables of interest, the processes for women appear to differ more by educational attainment than is the case for men. For women, their subjective economic insecurity is more sensitive to factors such as

family formation and labor market experiences when they do not have a college degree. The starkest differences between men and women without a college degree are consistent with other economic outcomes: marriage is more important for women, and labor force attachment is more important for men. Women are only harmed by not working if they have experienced a disabling condition, whereas men are harmed by not working regardless of whether they have a disability. This is partially because men are less likely to voluntarily exit the labor force if they are physically able to work, whereas non-working women are more likely to be homemakers. However, ancillary analyses show that unemployment has a larger negative effect on men than women, even when I separate out homemakers. This could mean that women's economic insecurity is actually less sensitive to their own employment patterns because men are more likely to be the breadwinning spouse. It could also be that men are more individualistic when considering their economic situation, especially when they are unemployed.

Table 5.5 presents similar models for women and men *with* a college degree. Model 1 indicates that, for women with a college degree, taking higher levels of math courses protects against economic insecurity. Taken together with the results from Tables 5.2 and 5.4, this suggests that math course-taking guards against economic insecurity for all women and may have a twofold effect for women who obtain a college degree. In Model 2, popularity again protects against economic insecurity for women, and both women and men with a college degree benefit from a more internal locus of control. Having a greater sense of control over their lives may matter more for people with a college degree because they likely have a greater ability to exercise that control. After adding family formation and the adult health and work measures in the next two models, the results remain largely unchanged. The work and health measures attenuate most of the significant predictors to some extent, but they act as slight suppressors for early childbearing, which appears beneficial for women with a college degree, net of the other factors. This somewhat counterintuitive finding may mean that early childbearing among these women was more likely to be planned, or that these women have less financial and time burdens compared to their peers who may have children still living at home or in college. Model 4 also

includes the same indicators of differences across samples as Table 5.4. Among men and women with a college degree, the main gender differences appear to be the effects of popularity and labor force attachment. Interestingly, men with a college degree do not suffer from greater economic insecurity when they are not working and have a disability, in contrast to every other subsample.

Table 5.5 Coefficients from OLS Regressions Predicting Subjective Economic Insecurity at Midlife - Women and Men with a Bachelor's Degree

	Model 1		Model 2		Model 3		Model 4	
N = 2,360 women; 1,880 men	Women	Men	Women	Men	Women	Men	Women	Men
Skills and Psychosocial Factors								
Math test score (std)	-0.054	-0.018	-0.026	-0.007	-0.027	-0.005	-0.031	**0.004**
	(0.038)	(0.027)	(0.035)	(0.026)	(0.035)	(0.026)	(0.032)	(0.026)
Math course level (ref: middle)								
Low	0.337	0.075	0.311	0.074	0.318	0.064	0.266	0.062
	(0.256)	(0.144)	(0.227)	(0.140)	(0.222)	(0.136)	(0.164)	(0.128)
High	-0.150***	-0.074	-0.121**	-0.058	-0.128**	-0.057	**-0.107****	-0.048
	(0.042)	(0.041)	(0.042)	(0.041)	(0.042)	(0.041)	(0.041)	(0.040)
Locus of control (std)			-0.080**	-0.080**	-0.086***	-0.080**	**-0.072****	-0.072**
			(0.026)	(0.027)	(0.026)	(0.026)	(0.025)	(0.026)
Perceived as unattractive			-0.071	0.131	-0.082	0.126	-0.101 ‡	0.072
			(0.069)	(0.069)	(0.069)	(0.070)	(0.063)	(0.070)
Popular			-0.337**	0.070	-0.311**	0.076	-0.269** ‡	0.065
			(0.112)	(0.050)	(0.103)	(0.051)	(0.089)	(0.050)
Confidence in ability to complete college			0.066	0.004	0.063	0.003	0.045	-0.003
			(0.043)	(0.034)	(0.044)	(0.033)	(0.043)	(0.031)
Family Formation								
Early childbearing					-0.147	0.102	**-0.202***	0.075
					(0.106)	(0.111)	(0.099)	(0.102)
Married					-0.179**	-0.101*	**-0.143****	-0.054
					(0.057)	(0.051)	(0.052)	(0.050)
Work at Midlife								
Average occupational wages (logged)							**-0.110****	-0.118**
							(0.040)	(0.038)

Table 5.5, *continued*	Model 1		Model 2		Model 3		Model 4		
	Women	Men	Women	Men	Women	Men	Women		Men
Labor force attachment (ref: working, no disability)									
Not working, no disability							0.038		0.347*
							(0.083)		(0.145)
Working, disability							0.019		0.013
							(0.083)		(0.062)
Not working, disability							0.565***	‡	**0.094**
							(0.143)		(0.151)
Self-rated health							-0.126***		-0.076**
							(0.026)		(0.023)
Sociodemographic and School Controls									
Race/ethnicity (ref: non-Hispanic white)									
Black	0.218	0.219*	0.222	0.206*	0.205	0.194*	0.170		0.168*
	(0.136)	(0.091)	(0.124)	(0.090)	(0.127)	(0.087)	(0.120)		(0.083)
Hispanic	-0.183	0.005	-0.168	0.014	-0.143	0.005	-0.143		-0.010
	(0.097)	(0.061)	(0.090)	(0.060)	(0.087)	(0.060)	(0.082)		(0.059)
Other race/ethnicity	-0.057	0.000	-0.103	-0.008	-0.078	-0.009	-0.070		0.028
	(0.078)	(0.071)	(0.089)	(0.075)	(0.086)	(0.073)	(0.090)		(0.074)
Family income (ref: middle tercile)									
Lower tercile	0.150*	0.106	0.122	0.082	0.117	0.074	0.112		0.081
	(0.075)	(0.060)	(0.066)	(0.057)	(0.064)	(0.056)	(0.060)		(0.054)
Upper tercile	-0.117*	-0.063	-0.109*	-0.065	-0.108*	-0.065	-0.106*		-0.063
	(0.048)	(0.035)	(0.048)	(0.035)	(0.048)	(0.035)	(0.047)		(0.034)

Table 5.5, *continued*	Model 1		Model 2		Model 3		Model 4	
	Women	Men	Women	Men	Women	Men	Women	Men
Parent education (ref: high school)								
Less than high school	-0.080	-0.065	-0.134	-0.071	-0.112	-0.071	-0.059	-0.080
	(0.181)	(0.071)	(0.182)	(0.071)	(0.176)	(0.071)	(0.170)	(0.075)
Bachelor's degree or above	-0.085	-0.011	-0.068	-0.005	-0.066	-0.006	-0.054	-0.013
	(0.047)	(0.038)	(0.046)	(0.038)	(0.046)	(0.038)	(0.043)	(0.036)
School urbanicity (ref: suburban)								
Urban	0.042	0.041	0.044	0.037	0.039	0.036	0.034	0.028
	(0.081)	(0.057)	(0.075)	(0.055)	(0.073)	(0.054)	(0.068)	(0.051)
Rural	-0.001	-0.077	0.000	-0.074	0.010	-0.079*	0.011	-0.074
	(0.055)	(0.042)	(0.052)	(0.040)	(0.051)	(0.040)	(0.048)	(0.040)
Disability in high school	0.010	0.037	-0.043	0.019	-0.042	0.009	-0.089	**-0.011**
	(0.092)	(0.065)	(0.099)	(0.068)	(0.100)	(0.069)	(0.095)	(0.069)
Lived with both biological parents	0.021	0.060	0.014	0.055	0.024	0.060	0.016	0.066
	(0.065)	(0.047)	(0.061)	(0.046)	(0.059)	(0.046)	(0.052)	(0.046)
South region	0.151	0.019	0.164	0.015	0.170	0.018	0.152	0.003
	(0.117)	(0.066)	(0.107)	(0.062)	(0.104)	(0.061)	(0.099)	(0.062)
Private school	0.032	-0.024	0.046	-0.035	0.046	-0.034	0.048	-0.044
	(0.053)	(0.038)	(0.051)	(0.039)	(0.050)	(0.040)	(0.044)	(0.041)
Senior cohort	0.026	-0.020	0.039	-0.025	0.042	-0.022	0.053	-0.023
	(0.046)	(0.035)	(0.044)	(0.035)	(0.043)	(0.035)	(0.040)	(0.033)
Constant	1.426***	1.241***	1.625***	1.179***	1.740***	1.248***	2.538***	1.939***
	(0.077)	(0.062)	(0.165)	(0.102)	(0.179)	(0.109)	(0.258)	(0.205)
R-squared	0.111	0.051	0.155	0.071	0.169	0.078	0.237	0.120

*** p<0.001, ** p<0.01, * p<0.05 (standard errors in parentheses)

Bolded coefficients are significantly different from same-gender peers without a college degree

‡ indicates a significant difference between the coefficients for women and men

Subjective Economic Insecurity as a Household Measure

Though subjective economic insecurity is reported by individuals, it is likely that individuals who share finances with a partner are actually considering their *household's* ability to come up with funds. Thus, married individuals may have access to resources that have little to do with their own characteristics, apart from the correlation of these characteristics with selection into marriage. I investigate this possibility by testing whether the effect of variables within each subsample vary by marital status.

Table 5.6 presents the main findings from OLS regressions for each subsample that include the full models (Model 4 in Tables 5.4 and 5.5), with all variables interacted with the dummy for "married." I only include significant interactions for each subsample, and the markers indicate whether a difference in coefficients corresponds to a relative benefit (+) or detriment (-) for married individuals compared to their unmarried peers. It is clear from these findings that marriage alters the relationship between individual characteristics and subjective economic insecurity the most for women with a college degree. Among women with a college degree, unmarried women benefit more from psychosocial factors, and married women fare better than unmarried women if they are not working. These differences all indicate that subjective economic insecurity is tapping a household measure, at least for college-educated women.

However, we see less evidence of this for men and for women without a college degree. I find no significant differences among men with a college degree, though the differences among men without a college degree may correspond to the quality of partners for married men. The only significant difference among the variables of interest for women without a degree is that married women benefit less from higher levels of non-wage benefits in their occupations. Though this is an intuitive finding, it underscores the heightened consequences of occupational precarity for women without a college degree.

Table 5.6. Significant Differences in Predictors of Subjective Economic Insecurity by Marital Status

	No college degree		College degree	
	Women	Men	Women	Men
Skills and Psychosocial Factors				
Locus of control (std)			-	
Popular		+	-	
Confidence in ability to complete college			-	
Work at Midlife				
Non-wage benefits of occupation (std)	-			
Labor force attachment				
Not working, no disability			+	
Not working, disability			+	
Sociodemographic and School Controls				
Race/ethnicity (ref: non-Hispanic white)				
Black			-	
Parent education (ref: high school)				
Less than high school		+		
School urbanicity (ref: suburban)				
Urban			+	
Rural	-			

+ relative benefit to married individuals, compared to unmarried peers
- relative detriment to married individuals, compared to unmarried peers

DISCUSSION

In an era of increasing inequality and worsening conditions at the bottom of the labor market, much of the research on economic wellbeing has focused on people's positions within a stratified society such as wages, occupations, or educational attainment. These measures are vital to understanding social inequality, but they are necessarily static indicators of variation in levels of socioeconomic status. A dynamic perspective on social stratification is concerned, instead,

with changes in economic status – insecurity rather than inequality (Western et al. 2012). A focus on economic *insecurity* incorporates the unpredictability of daily life to understand people's risk of economic loss and ability to cope with unpredictable events, regardless of their level of socioeconomic status. In this chapter, I examined how early skills and psychosocial factors shape later economic insecurity and how these relationships vary across social contexts. I argue that these earlier-life factors operate in part through individuals' socioeconomic status but also by influencing how well-equipped people are to navigate a complex social world.

I find that early skills and psychosocial factors are related to subjective economic security at midlife, but these relationships vary across social contexts. My findings suggest that the predictors of economic insecurity vary by the interaction between gender, educational attainment, and marital status. These characteristics combine to form distinct risk contexts that shape individuals' opportunities and pathways to economic insecurity. I find that early characteristics sort people into different contexts, but they also help them navigate within those contexts.

Though processes vary across groups, one consistent finding is the importance of mathematics – either cognitive math abilities or higher levels of math course-taking. The only group for whom math was not significant was men with a college degree, who are most advantaged in the labor market and least likely to experience economic insecurity. For women, math protected against economic insecurity, in part, because taking high levels of math led to college degrees. However, even among women with the same level of education, higher levels of math course-taking were protective, and higher math test scores were independently predictive for women without a college degree. Men without a college degree benefited from higher math test scores, as well. These significant associations between math and economic insecurity persisted even after accounting for individuals' adult health and labor market experiences, implying that math skills or preparation may account for part of the variation among people with similar socioeconomic characteristics.

Psychosocial factors generally played a less consistent role in predicting economic insecurity compared to the math measures. As I hypothesized, having a greater sense of control over their lives mattered for men and women with a college degree, but not for people without a degree. This may be due to individual attitudes and behaviors mattering more for subjective economic insecurity once people reach a certain level of socioeconomic status. Previous research has suggested that men and women attach significance to different sources of self-esteem, and my findings provide some support for this notion. Women consistently had better outcomes if they reported being popular in high school, whereas perceived unattractiveness was associated with higher levels of insecurity for men but was explained by its relationship to health and labor market characteristics. This pattern implies that positive aspects of self-esteem may benefit women, and negative aspects of self-esteem, or self-deprecation, seems to harm men by leading to worse adult outcomes. A possible explanation for the importance of popularity for women is that it may be correlated with better interpersonal skills that help women advance within their occupations or lead to higher-quality partners. However, I hesitate to place too much emphasis on these findings, as almost 80% of the sample reports being popular in high school.

Importantly, my final analysis indicated that some of the predictors of economic insecurity varied significantly by marital status. I found that marriage especially altered the processes leading to economic insecurity for women with a college degree. Among women with a college degree, unmarried women's economic insecurity was more sensitive to their own characteristics, especially psychosocial factors and labor force attachment. Marriage largely serves as an equalizer for women with a college degree, and their subjective economic insecurity is less dependent on their individual characteristics. I did not find the same to be true for women without a college degree. Most of the predictors of economic insecurity were the same regardless of whether they were married, with the main exception being that non-wage occupational benefits mattered more for unmarried women.

These findings provide some support for the idea that economic insecurity is best understood as a household measure, though for most of the sample, the addition of another adult

in the household did not significantly alter the predictors of insecurity. The processes may not vary much for men because they are more likely to be the breadwinner and may have more control over the household's finances, regardless of whether they are single or married. As for women without a college degree, the material economic benefits of work may be of paramount importance for their economic insecurity even when they are married because they are likely to have spouses who also do not have a college degree. Beyond having lower wages, men without a college degree are also more likely to be unemployed or to exit the labor force early compared to men with a college degree. Thus, marriage may not provide the same stability or relief of personal risk for women without a college degree. Because I only have information on the individual respondents, I cannot account for the actual characteristics of their spouses or other household members in this chapter's analyses. Dyadic or household-level data could better elucidate how marriage alters pathways to economic insecurity across groups.

Chapter 6: Conclusion

People are living longer than ever before, while the security of retirement benefits grows increasingly precarious. Declines in pensions and retiree health benefits have led to concerns about workers' abilities to afford retirement in the face of increasing life expectancy, and personal retirement savings are becoming vital for secure retirements. These trends render work in the preretirement years of utmost importance. At midlife, people are generally experiencing peak earnings and accumulating wealth they need to finance their retirements. Even for workers who are not accumulating wealth, the quality of their employment experiences and attachment to the labor force at midlife influence whether they will work long enough to obtain full Social Security benefits. Economic insecurity in the preretirement years can have severe and lasting consequences, when people have less time and fewer opportunities to recover or improve their situation. In this dissertation, I argue that economic insecurity at midlife is the result of an accumulation of a lifetime of experiences and decisions that are shaped, in part, by the skills that people carry into adulthood. A wealth of research has established that adult characteristics like educational attainment and income predict economic wellbeing later in life. Early-life factors are less well-known, partly because the surveys traditionally used to study middle-aged individuals' work and finances only reach respondents as adults.

Individuals' skills in high school impact their life chances, sorting them into higher education and the labor market and providing resources for managing their careers, health, and finances. Because returns to skills increase over time, skill disparities may be particularly pronounced at midlife. Recent social and economic trends only underscore the role that skills may play in guarding against insecurity, suggesting that all students may benefit in the long run from academic coursework that fosters higher-order cognitive skills. Computerization and the shift to a knowledge-based economy has increased the importance of cognitive skills in occupations across the educational spectrum. The individualization of economic risk and the expansion of the financial economy has increased the need for and access to consumer finance

and financial products. When the onus of decision-making is placed on individuals, how well they navigate this environment becomes more individualized, as well. Thus, the devolution of financial risk may intensify skill-based stratification in long-term economic outcomes.

This dissertation focused on understanding how skill-based disparities in economic insecurity depend upon and vary across social contexts. Specifically, I investigated the importance of gender and educational attainment in shaping individuals' opportunity structures, which place people at different risks of economic insecurity and alters the processes that predict insecurity. Chapter 3 focused on employment and how skills support long-term labor force attachment. I found that skills support employment for men and women, but these pathways differ due in part to gendered dynamics in labor force participation, especially among married workers. Math coursework was significantly protective for women, regardless of educational attainment, occupation, or family formation. For men, the role of skills operated in part through educational attainment and higher-wage occupations.

In addition, marriage strongly predicted employment for men, whereas I saw the opposite relationship for women – married women were more likely to voluntarily exit the labor force and less likely to be working. Further, a college degree did not independently predict employment for women, implying positive selection out of the labor force. These trends align with a gendered household division of labor in which more advantaged women are "able" to exit the labor force and men remain working in higher-paying jobs. This tradeoff has implications for women's economic independence and insecurity and likely contributes to the negative economic effects of separation and divorce. Household dependence on one source of income transforms marriage into a concentration of greater risk rather than a diffusion of risk across household members.

Separation from the workforce is a stark indicator of economic insecurity, but employment is not equally protective against economic insecurity for all people. Heterogeneity in economic benefits across occupations carries increased risks in a labor market characterized by polarization, a shifting of burdens from employers to employees, and precarious work arrangements. In Chapter 4, I investigated workers' risks of working in a bad job and how those

risks are shaped by the interaction between their individual characteristics and structural constraints in the labor market. I focused on understanding how academic coursework in high school might protect people against the worst occupations and jobs by providing skills that are valued by employers and that may support career mobility. I found that higher levels of math coursework protected women without a college degree from bad occupations, and more rigorous math coursework led to fewer bad job characteristics for all women, regardless of their occupations or educational attainment. However, men's occupational outcomes were less affected by academic coursework, partially due to male-dominated occupations having fewer bad characteristics. In addition, among people without a bachelor's degree, women's occupations showed a tighter link between precarity and math knowledge demands, suggesting that math-related skills may be more important for women in avoiding the worst occupations. In fact, the within-gender gap in occupational precarity based on whether women took Algebra 2 was actually larger than the overall between-gender gap, highlighting significant disparities among women workers.

In my last analytic chapter, I moved beyond objective measures related to labor market insecurity to examine people's subjective experience of economic insecurity. This enabled me to investigate not only how early factors may shape economic insecurity independent of labor market experiences but also how the dimensions of insecurity from Chapters 3 and 4 are connected to individuals' economic wellbeing. I found that math coursework protected women against subjective economic insecurity, regardless of their level of education, and higher math skills benefited workers without college degrees. As I expected, cognitive skills mattered less for people with a college degree; instead, they benefited from a greater sense of control over their lives. Though subjective economic insecurity is really a household measure of insecurity, I found that the relationships between individuals' characteristics and their subjective insecurity largely did not vary by marital status, except for women with a college degree. Among women with a college degree, married women's economic insecurity was less dependent on their own characteristics compared to unmarried women; psychosocial factors mattered more for unmarried

women's insecurity, and employment mattered less for married women. This suggests that marriage reduces skill-based disparities in economic insecurity among college-educated women, whereas skills are not predictive for college-educated men regardless of marital status.

This research sheds light on the possible long-term effects of curricular intensification in the "college-for-all" era. Almost all students now expect to attend college, but less than half of these students will attain college degrees (Rosenbaum et al. 2010). My findings suggest that women who attended high school in the context of rising college attendance and curricular standards received a significant economic benefit at midlife from higher levels of math coursework, even when they did not attain a college degree. Though I did not see as consistent of a relationship for men across outcomes, I did find that math protected men without a degree against some forms of economic insecurity. I cannot say whether such returns to math will persist for future generations, though I have some reason to think that they will. First, the effects of math coursework on wages has been found across age cohorts. More generally, the effects of math coursework on postsecondary outcomes are remarkably stable, even for recent high school graduates (Riegle-Crumb et al. 2012). Second, as additional burdens of risk continue to be shifted from employers to employees, I expect that workers with skills that are in higher demand will receive a premium for those skills, especially if they give workers the ability to learn on the job. Without strong social safety nets, the increasing emphasis on personal financial responsibility will likely sustain or strengthen skill-based disparities among workers.

Studies that focus on advanced math coursework in high school for women generally underscore its importance for entering lucrative STEM fields (Bozick et al. 2017). My findings suggest that the same coursework that can narrow gender differences in high-status STEM occupations (Legewie and DiPrete 2014) may also help alleviate gender inequality at the bottom of the labor market. My findings underscore the importance of rigorous math coursework across the spectrum of occupations. Advanced academic coursework in high school helps women obtain high-status jobs through higher education, but it can help women avoid bad jobs and economic outcomes later in life, as well. Considering that women have lower lifetime earnings and are on

average less prepared for retirement than men, avoiding economic insecurity in the midlife years is especially important for women.

My findings highlight the lingering disadvantage of women in the labor market and the importance of education for women's economic security, in terms of both educational content and attainment. The growing female advantage in college completion (Buchmann and DiPrete 2006) and the greater decline of real wages for men in the sub-baccalaureate labor market contribute to a perception that women are doing relatively well (McCall 2000). Women have made great strides in the labor market overall, and the gains of higher-educated women have largely overshadowed the worsening situation of women at the bottom of the labor market (Dwyer 2013; McCall 2000). In fact, the growing concentration of jobs at the bottom of the wage distribution has been fueled by growth in low-wage care work occupations, which are female-dominated (Dwyer 2013). The devaluation of the types of relational skills involved in care work (England 1992) may partially explain the large gender disparities I saw in bad characteristics among occupations with lower levels of math knowledge demands.

I focused on understanding how academic preparation and skills matter differently by gender and educational attainment, to account for significant boundaries that shape opportunities. However, it is important to also consider how these relationships may vary by race or socioeconomic status, both known drivers of inequality in academic course-taking in high school (Lucas 1999; Lucas and Berends 2002; Oakes 2005). Though sample size prevented me from further stratifying my models, ancillary analyses indicate that the protective effect of math may be strongest for black women, and thus future research should focus on understanding how academic preparation may serve as a safety net for other disadvantaged groups. Further, research has shown that coursework and its effects vary across local labor market contexts (Sutton 2017; Sutton, Bosky, and Muller 2016), and local labor market opportunities may influence the actual or perceived value of academic coursework for women and men in their local economies.

Identifying early-life factors that contribute to economic wellbeing at midlife can increase our understanding of the long-term processes that predicate insecure retirements and

economic inequalities in old age. Economic insecurity is not something that "just happens" later in life – it is necessarily cumulative and starts before people even enter adulthood. People's opportunities and choices over the life course lead to their economic position later in life, and this research sheds light on the types of skills that help individuals build long-run economic security in a complex financial world. Understanding the predictors of long-run economic insecurity may inform policymakers about who is likely to be reliant on government benefits in future years and, thus, most sensitive to policy changes.

Research shows that skills can be developed and changed at different points in the life course and are particularly malleable during childhood and adolescence (Cunha and Heckman 2007). While employers or social welfare programs can try to find ways to reduce skill-based disparities, schools are in a unique position to influence skill-building early in people's lives and support economic resilience across the life course. Academic preparation in high school can help prepare students not only for economic success but also to avoid economic precarity. My results suggest that the academic courses students take in high school may have long-run implications not only for their own careers and economic wellbeing but also for overall gender inequality.

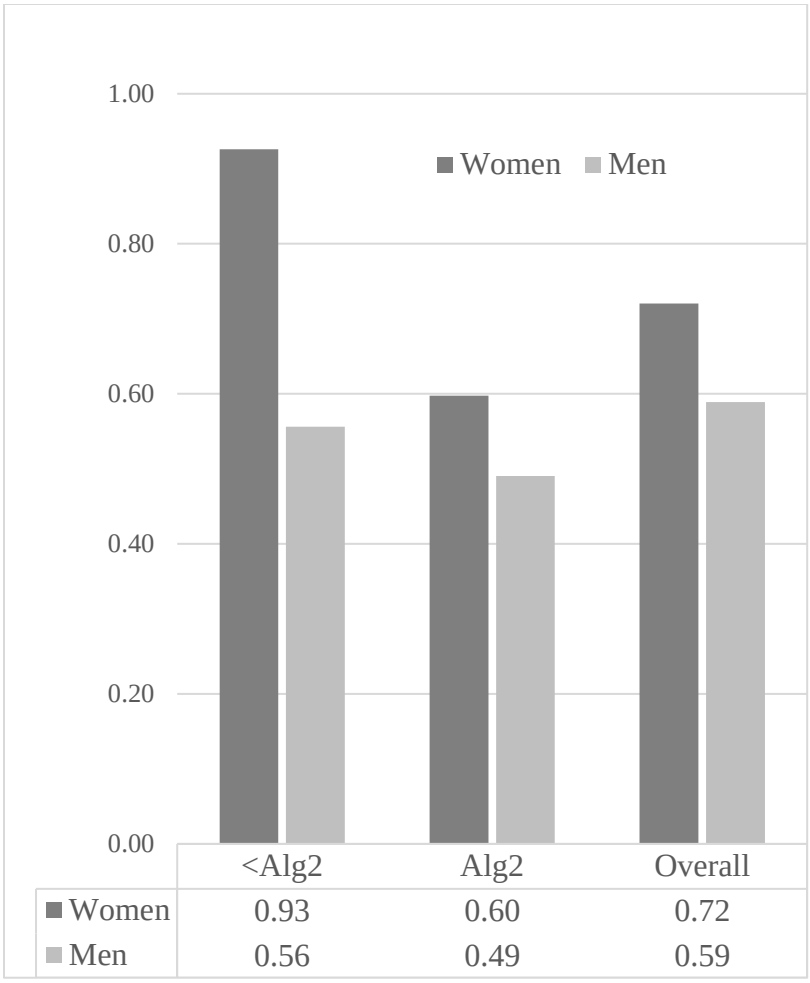
Appendix

Table A1: O*NET Physical Demands Measure – Items and Cronbach's Alpha

2014 (Cronbach's alpha = .94)
Handling and moving objects
Performing general physical activities
Time spent bending or twisting body
Time spent climbing ladders, scaffolds, poles, etc.
Time spent keeping or regaining balance
Time spent kneeling, crouching, stooping, or crawling
Time spent standing
Time spent using hands to handle, control, or feel objects, tools, or controls
Time spent walking or running
Keeping a pace set by machinery or equipment
Time spent making repetitive motions

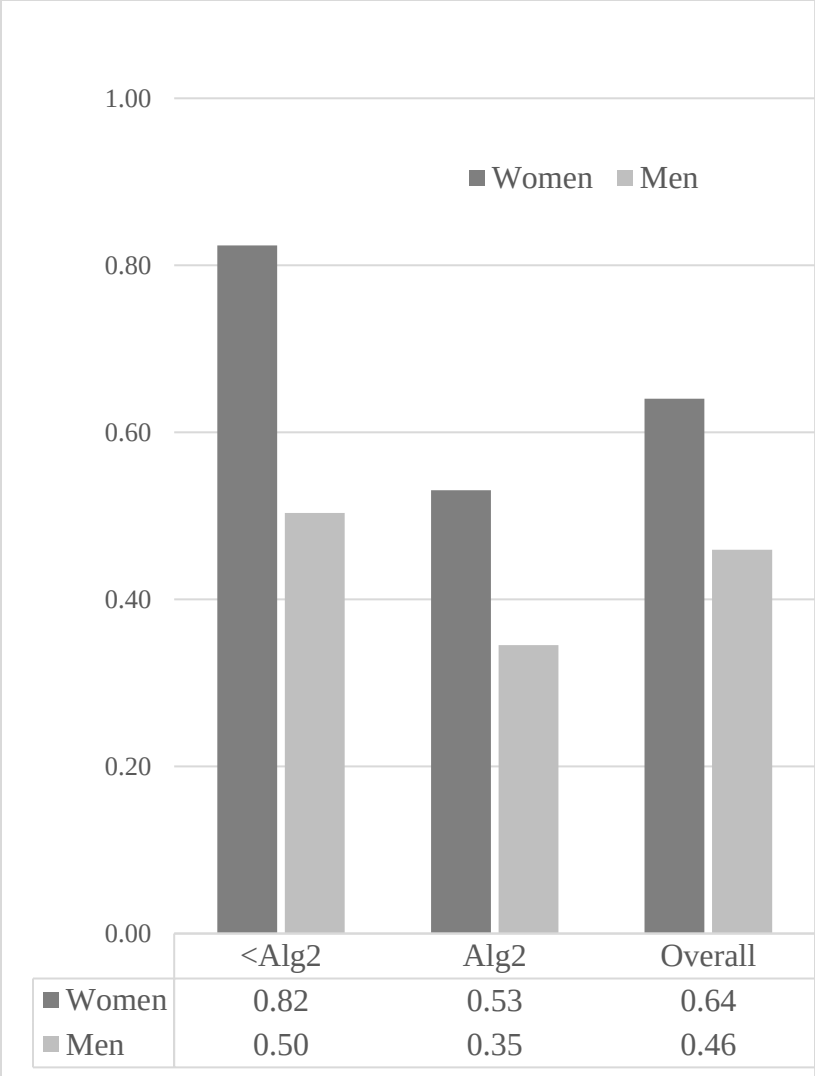
Table A2: Weighted Means and Proportions of Control Variables, by Degree Attainment and Gender

	No Bachelor's Degree		Bachelor's Degree	
	Women	**Men**	**Women**	**Men**
Sample (n=8,040)	.29	.29	.22	.20
Race/Ethnicity				
White	.69	.67	.82	.81
Black	.14	.13	.09	.09
Hispanic	.14	.15	.06	.07
Other race	.03	.05	.03	.03
Parent has Bachelor's degree	.13	.19	.45	.49
Family income (in high school)	$18,346.35 (313.37)	$20,668.03 (350.03)	$24,094.54 (12,584.15)	$27,010.90 (13,277.94)
Lived with both parents	.64	.69	.75	.78
High school sector				
Public	.94	.95	.83	.83
Private	.06	.05	.17	.17
High school urbanicity				
Urban	.22	.20	.20	.16
Suburban	.48	.49	.52	.56
Rural	.30	.31	.28	.28
South region (high school)	.34	.31	.29	.27
Has not worked in past 5 years (2014)	.10	.07	.06	.01



	<Alg2	Alg2	Overall
Women	0.93	0.60	0.72
Men	0.56	0.49	0.59

Figure A1. Average Predicted Count of Bad Occupational Characteristics at Midlife, Aggregated By Gender



	<Alg2	Alg2	Overall
Women	0.82	0.53	0.64
Men	0.50	0.35	0.46

Figure A2. Average Predicted Count of Bad Job Characteristics at Midlife, Controlling for Bad Occupational Characteristics and Aggregated by Gender

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