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LASTING SCARS:

THE IMPACT OF DEPRESSION IN EARLY ADULTHOOD ON SUBSEQUENT LABOR MARKET OUTCOMES

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Abstract

A growing body of evidence indicates that poor health early in life can leave lasting scars on adult health and economic outcomes. While much of this literature focuses on childhood experiences, mechanisms generating these lasting effects – recurrence of illness and interruption of human capital accumulation – are not limited to childhood. In this study, we examine how an episode of depression experienced in early adulthood affects subsequent labor market outcomes. We find that, at age 50, people who had met diagnostic criteria for depression when surveyed at ages 27-35 earn 10% lower hourly wages (conditional on occupation) and work 120-180 fewer hours annually, together generating 24% lower annual wage incomes. A portion of this income penalty (21-39%) occurs because depression is often a chronic condition, recurring later in life. But a substantial share (25-55%) occurs because depression in early adulthood disrupts human capital accumulation, by reducing work experience and by influencing selection into occupations with skill distributions that offer lower potential for wage growth. These lingering effects of early depression reinforce the importance of early and multifaceted intervention to address depression and its follow-on effects in the workplace.

Keywords

Labor market consequence of mental illness, Mental illness and human capital accumulation, Mental illness and occupation, Long-term impact of depression in early adulthood

Classification codes

J24, J14, J18, I15

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I. Introduction

Depression is a common chronic condition. According to the National Institute of Mental Health (2020), in 2019, 8.4% of U.S. adults and 17% of adolescents had experienced at least one episode of major depression. Beyond its toll on well-being, depression has significant negative economic effects. A 2010 cost of illness estimate put the social cost of major depressive disorder at over 200 billion dollars; half of this cost is attributable to absenteeism and presenteeism in the workplace (Greenberg et al. 2015).

Unlike most other chronic conditions, the initial onset of depression often occurs in or before early adulthood (Zisook et al., 2007). Research has documented the long-term consequences of childhood and adolescent ill health, suggesting that early onset illnesses frequently have lingering effects on economic outcomes. Goodman, Joyce, and Smith (2011), following children born in 1958 using the British National Child Development Study, document that childhood psychological conditions have substantial lasting impacts on adult outcomes. Similarly, research using registry data from Finland finds that mental health conditions in later adolescence and early adulthood have sequelae that continue through at least age 50 (Hakulinen et al., 2019). Health conditions earlier in life may affect later-life labor market outcomes both because the condition itself recurs and because it interferes with investments in human capital, which, through skill development and accumulation of on-the-job experience has effects well beyond childhood.

In this paper, we focus on long-term impacts of depression in the U.S. context using the National Longitudinal Survey of Youth 1979 (NLSY79). We examine the impact of early-adulthood depression (at ages 27-35) on a broad array of individual work-related outcomes at age 50, including employment status, receipt of disability benefits, hourly wage, annual hours worked, and annual earnings. Building on evidence from the epidemiology of depression and the economics of human capital accumulation, we use the rich longitudinal data available in the NLSY to explore the hypothesis that early-adulthood depression can compromise long-term

economic security both by decreasing human capital accumulation and by increasing the risk of depression later in life.

The rest of the paper is organized as follows: in section II, we summarize the existing literature on the long-term impacts of early depression. In section III, we describe the NLSY79 and O*NET data. In section IV, we describe our empirical strategy. In section V, we present results on the effect of early-adulthood depression on outcomes at age 50. In section VI, we describe the roles of human capital accumulation and recurrent depression in explaining the impact of early-adulthood depression on outcomes at age 50. Section VII concludes.

II. Literature Review

Numerous prior studies have documented the negative impact of contemporaneous depression on labor market-related outcomes: depression is associated with increased unemployment, lower productivity at work, lower wages and income, lower levels of educational attainment, and higher probabilities of applying for disability insurance (Conti, Berndt, and Frank 2006; Peng, Meyerhoefer, and Zuvekas 2016; Birnbaum et al. 2010; Bjelland et al. 2008; Ettner, Frank, and Kessler 1997; Banerjee, Chatterji and Lahiri 2017). A focus of this literature has been on establishing a causal relationship between contemporaneous depression and outcomes– disentangling the potential effects of life circumstances on depressive symptoms from the effects of depressive symptoms on life circumstances (Hamilton, Merrigan, and Dufresne 1997; Brand, Levy, and Gallo 2008; Prause, Dooley, and Huh 2009; Dooley, Prause, and Ham-Rowbottom 2000). Research on the longitudinal economic impact of early depression and the mechanisms through which depression early in life may generate long-lasting impacts is more limited.

Three previous studies have provided some evidence of the negative relationship between early adult depression and subsequent labor market-related outcomes. Using national longitudinal data from Finland, Hakulinen et al. (2019) find that, compared to people aged 15 to

25 with no serious mental disorders, those in that age group with diagnosed depressive disorders are about three times more likely to become unemployed and to have no high school or college education at age 50. The median wage of those in this group at age 50 is also much lower than that of their counterparts without early depression. Using U.S. Add Health data, Fletcher (2013) presents evidence that adolescent depression decreases the probability of employment at (about) age 27 by 5% and income at that age by 15%. Goodman, Joyce, and Smith (2011) find that children who experienced psychological problems in childhood have family incomes 28% below those of their peers at age 50.

In a related study, Berndt et al. (2000) examine the adverse impact of earlier depression on human capital accumulation. Using clinical trial data and income data from Current Population Survey, they find that compared to women with onset of depression after age 21, women (but not men) who experience the onset of depression by age 21 are 43% less likely to obtain college degrees and 50% less likely to pursue post-graduate degrees, which together lead to an income loss of 18% at age 55.

The adverse impact of depression on human capital may also occur in the form of deficits in job skills. Depression can have direct impacts on cognitive function including limiting executive function, memory, and attention (Millan et al. 2012; Rock et al. 2014). Adler et al. (2006) find that workers diagnosed with depression at baseline continue to have difficulty performing mental-interpersonal, time-related, and output-related job tasks during subsequent surveys and that these difficulties persist even after the depression itself becomes less severe. The presence of such impairments in the early part of a person's work-life may influence their realized jobs. If impairments persist, then, over the longer term, depression can affect both the kinds of jobs that individuals hold and their on-the-job productivity. Even if impairments are transitory, the effect of earlier life depression on job choice may have long-term consequences, because of the differences in the wage trajectories of occupations over time (Autor, Levy, and Murnane, 2003).

Early life depression can also result in adverse impacts on later outcomes through the recurrence or persistence of depression itself later in life. Depression has an average age of onset of 24 and has a recurrence rate of about 80% (Sim et al. 2016). The relapse and persistence of depression make it more likely for individuals to drop out of the labor market (Luo et al. 2010). Recurrences of depression can also co-occur with other medical conditions. Farmer et al. (2008) document that people suffering from recurrent depression are also at higher risks of 14 other medical illnesses and tend to manage the treatments for those illnesses less well. Together, such patterns of comorbidities may damage the labor market prospects of people with depression.

III. Data and Descriptive Statistics

We used the National Longitudinal Survey of Youth 1979 (NLSY79) and the Occupational Informational Network (O*NET) to examine the sequelae of depression. The NLSY79 follows 12,686 American youth born between 1957 and 1964. Respondents were between the ages of 14 and 22 when first interviewed in 1979 and were 53 to 62 years old when last interviewed in 2018. The survey consists of three subsamples. The first sample includes 6,111 respondents who represent civilian youth born between 1957-1964 and living in the United States in 1979. The second sample includes 5,295 respondents and oversamples Hispanic, Black and economically disadvantaged non-Hispanic and non-Black youths. The third sample includes 1,280 respondents serving in the military. The O*NET data, collected by the Bureau of Labor Statistics, provides detailed information on the characteristics of occupations including the skills that encompass.

Questions on mental health are included in the 1992 and 1994 NLSY79 surveys, and in two age-based health modules: respondents participated in the age-40 health module when they were at least 40 years old and participated in the age-50 module when they were at least 50 years old. Since respondents reached age 40 and 50 during different years, the age-40

module was administered every two years between 1998-2006 and the age-50 module was administered every two years between 2008-16. Respondents were 27-35 years of age at the time of the 1992 survey.

To identify people with depression, we use the 7-item Center for Epidemiological Studies Depression Scale (CES-D), which is available in the 1992 and 1994 surveys and the two age-based health modules. This index has good psychometric properties (Levine 2013) and has been used extensively in previous research on depression (Wraw et al. 2016; Carlson 2012). The CES-D 7-item score ranges from 0-21 and a cutoff score of 8 is widely adopted to distinguish NLSY79 respondents with a high likelihood of having depression (Levine 2013).

We classified depression into mild, moderate, and severe levels. Since no well-established CES-D 7-item cutoffs have been defined for different severities, we develop our own cutoffs by making use of research that defined depression severity with the longer CES-D 20-item instrument. The CES-D 20-item test score (the longer version of CES-D 7-item test) has been used to categorize depression as follows: No Depression (0-15 points), Mild to Moderate Depression (16-30 points) and Severe Depression (31-60 points) (Hsu and Marshall, 1987). We used receiver-operating characteristic analysis (ROC analysis) to find the corresponding CES-D 7-item cutoffs: No Depression (0-7 points), Mild to Moderate Depression (8-13 points), Severe Depression (14-21 points) (details of the ROC analysis are included in section A of the appendix). These cutoffs were used to create indicator variables for mild to moderate depression and severe depression in 1992, in the age-40 and in the age-50 health modules. Since respondents were between 27 and 35 years old in 1992, we refer to depression in 1992 as *depression at ages 27-35*. Respondents with missing CES-D 7-item scores (either because they are not interviewed during the year or because they have failed to answer all 7 questions) in 1992, in the age-40 or age-50 module, are excluded from all analyses.

To focus on the effects of an episode of depression in early adulthood, we control for other characteristics of each individual in 1992 or at age 26. These include educational attainment at

age 26, marital status in 1992, and years of work experience accumulated by 1992. We also control for childhood and individual background characteristics, which might influence or signal the development of subsequent mental health conditions (Aneshensel and Sucoff, 1996), including respondent's health status during childhood (asked in the 2012-2016 surveys), smoking behavior in 1992, and indicators for whether a respondent's mother and father had any college education. In sensitivity analyses, we repeat our analyses excluding these childhood and family variables to assess the extent to which depression at ages 27-35 is a mediator between childhood circumstances and subsequent labor market outcomes.

Finally, local labor market conditions might also affect both mental health and labor market outcomes. We control for local unemployment rate in 1992, 1998, 2004 and the year the person's outcome variables were collected. Where values are missing for individual, family, and environmental characteristics, we include missing data indicators.

Outcome data are collected from the NLSY79 for the same year the person participates in the age-50 health module (2008-2016) or the nearest subsequent year when data are available. Employment status is determined by employment status at the date of interview during the age-50 health module. Receipt of disability payment is determined by the question on whether the respondent/respondent's spouse has received disability income in the past calendar year. Number of hours worked and annual wage income during each calendar year are directly extracted from the NLSY79. All annual wage incomes are deflated to the base year 1992 using the consumer price index (Federal Reserve Bank of Minneapolis). We use the O-NET data to examine the skill composition of each respondent's main occupation during the age-50 health module. Measures of skill composition are constructed using O*NET data from 2008-2016. For details on how we construct the job-skill scores and match with occupations see section B of the appendix. Five scores are constructed, measuring the occupation's composition of non-routine cognitive analytical skill, non-routine cognitive interpersonal skill, routine cognitive skill, routine manual skill, and non-routine manual physical skill.

Hourly wage of the main occupation is directly extracted from the NLSY79. When examining this hourly wage, we account for potential constraints imposed by depression on occupational choices by controlling for average productivity in each individual occupation. Average productivity of an occupation is proxied by its average hourly wage, collected and calculated from the Occupational Employment and Wage Statistics data (OEWS) of the Bureau of Labor Statistics (see Appendix C for details on NLSY79-OEWS match). We refer to this hourly wage measure as "occupational hourly wage". All hourly wages are deflated to the base year 1992 using the consumer price index. Finally, we construct multiple measures that capture human capital accumulation between the 1992 survey and age-50 health module. These include educational attainment during the age-50 health module, work experience accumulated between the 1992 survey and age-50 health-module, and tenure in the main occupation in which the respondent is employed during the age-50 health-module. To further capture the effects of occupation-specific human capital in the long run, we compute measures (during the age-50 health module) of the job-skill scores and the occupational hourly wage of the respondent's principal occupation in the 1992 survey.

For details on how we construct the samples for analyses, see Appendix D and E.

Table 1 presents descriptive statistics (unweighted) of the independent and dependent variables for the sample used in analysis of employment status (there is little variation in the statistics of independent variables across samples). During the 1992 survey, when respondents ranged in age from 27-35 years old, 17% of the sample had scores that classified them as having depression.[1] The rate of severe depression increases over time. About 3.8% of the

[1] This is considerably higher than reports from epidemiological studies of the general population. It is likely due in large part to the over-sampling of disadvantaged populations. This higher prevalence of depression can also be partially explained by our restriction on respondents having non-missing depression scores in the 1992 survey (at ages 27-35), age-40 and age-50 health module. If we do not impose such restriction, then among 12,686 NLSY79 respondents, using the same CES-D 7-item cutoff score (>=8), 12% can be classified as depressed in the 1992 survey, 10% can be classified as depressed during the age-40 health module and 11%

sample had scores that classified them as severely depressed at ages 27-35 (during the 1992 survey). During the age-50 health module, when respondents ranged from 49-59 years old, that percentage increased to 5.1%. Bivariate associations between depression and the outcome variables are reported in section F of the appendix.

IV. Empirical Strategy

We illustrate our empirical models using the example of employment status:

(1) Pr *(Y=1) = ƒ(EarlyDepression, X)*

Y is an indicator variable that indicates the person's employment status during the age-50 health module. f is the logit function. "EarlyDepression" are dummy variables that indicate severity of depression at ages 27-35. X represents the remainder of our independent variables (age, gender, race, for level of education by age 26, parental education, r marital status in 1992 survey, years of work experience accumulated by 1992 survey, the average percentage of weeks the person's work history data is unaccounted for by 1992 survey, health status during childhood, a dummy for number of cigarettes consumed by 1992 survey, year indicators, local unemployment rate in 1992, 1998, 2004, and the year the person's outcome variable is collected).

We use the same statistical framework to estimate the impact of early depression on receipt of disability payments. For the analyses of job skill scores, hours worked, log hourly wages, log occupational hourly wages, and log annual wage income, we estimate OLS models conditional on employment, with the same dummies on depression at ages 27-35 and independent variables.

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can be classified as depressed during the age-50 health module. The prevalence of 1992-depression in our restricted sample agrees with previous research that uses CES-D 7-item score to identify depression in the 1992 survey of NLSY79 (Levine 2013).

V. Results – Effect of Depression At ages 27-35 on Outcomes at Age 50

We begin by examining the impact of depression at ages 27-35 on outcomes at age 50 (Table 2). Mild to moderate depression between ages 27 and 35 is estimated to have consistently negative effects on labor market outcomes at age 50 that are significantly different from zero at conventional levels. Early depression at a mild to moderate level is associated with a 5.2 percentage-point reduced probability of being employed (on a base employment rate of 73.27%) and a 3.1 percentage point increased probability of receiving disability payments (on a base recipiency rate of 9.84%) than in the absence of a history of depression. People with mild to moderate depression work in occupations that, on average, pay about 6% less per hour than the average occupation. Conditional on occupation, those with mild to moderate depression earn about 10% less per hour than their counterparts without depression, consistent with evidence on presenteeism. People with mild to moderate depression work about 119 fewer hours a year, about 6% below the mean, consistent with evidence on absenteeism. The combination of working in less lucrative occupations, working fewer hours, and earning less per hour conditional on occupation translates into earnings that are about 24% below those of their counterparts classified as having no depression.

The effects of severe depression are generally larger in magnitude across the board, as one would expect. Those with severe depression are even less likely to be employed and more likely to be receiving disability payments. Compared to their counterparts with mild to moderate depression, they work in occupations with hourly wages that are about 2% lower, and they work 61 fewer hours a year. The only exception to this pattern is that conditional on occupation, the point estimate for the hourly wage penalty for having severe illness symptoms is somewhat smaller but not significantly different from the estimate for mild to moderate depression. In sum, those with severe depression at ages 27-35 who are employed at age 50 earn about 26% less annually than do those without symptoms at ages 27-35.

As a sensitivity analysis, we repeat these regressions omitting the variables for parental education, health status in childhood, and cigarette smoking to assess the role of depression as a moderator of childhood circumstances. Results are displayed in Appendix G. For all outcomes analyzed, the coefficients for mild/moderate and severe depression in column (1), where all controls are included, are very similar to those in column (2), where controls for childhood conditions are excluded. Moreover, coefficients on family characteristics in column (1) do not change substantially when measures of depression at ages 27-35 are excluded (column 3). This sensitivity analysis suggests that for analyses on labor outcome outcomes, our measures of early depression are indeed capturing the impact of depression, rather than early childhood experience and family backgrounds.

Table 3 describes the effects of depression symptoms on the skill composition of occupations held at age 50. We find that people who experience depression at ages 27-35 who are employed at age 50 are more likely to be in occupations that require relatively lower levels of non-routine cognitive analytical, non-routine interpersonal, and routine cognitive skills.

In Table H1 and H2 of the appendix, we repeat these analyses adding controls for moderate or severe depression at age 40 and age 50. Those with mild to moderate depression symptoms at 50 are 16% less likely to be working and earn 27% lower incomes conditional on working than do those without symptoms. Those with severe depression at 50 are 31% less likely to be working and earn 50% lower incomes conditional on working than do those without symptoms.

After controlling for contemporaneous depression, the effects of earlier life depression on labor force participation and disability payment receipt almost entirely disappear, consistent with the high rate of recurrence of depression. By contrast, depression at ages 27-35 continues to exert an influence on other labor market outcomes, even after controlling for recent depression and contemporaneous depression. For instance, the effect of depression prior at ages 27-35 on average occupational wages is almost as large as that reported in Table 2. The

effects of depression symptoms at ages 27-35 on hourly wages and hours worked decline by about 19%-57% after inclusion of the indicators of later depression.

VI. Results – Depression and Annual Wage Income at Age 50: Human Capital and Persistence Effects

To examine the effects of depression on human capital accumulation and the explanatory power of this mechanism on annual wage income, we compare results on annual wage income at age 50 from Table 2 with those from a model that controls for measures of human capital accumulation, including years of education accumulated between the 1992 survey and the age-50 health module, work experience accumulated between the 1992 survey and the age-50 health module, and tenure accumulated in the main occupation by the age 50 health-module. We also examine the pathway of the accumulation of occupational skill (another form of human capital), by including measures (during age-50 health module) of the job-skill scores and occupational hourly wage of the respondent's principal occupation in the 1992 survey. These two measures allow us to examine how occupational skill accumulate by 1992 (likely influenced by depression in 1992) interacts with the changing labor market prospects of occupations through age 50.

We examine the bivariate associations between depression and the accumulation of human capital in Table 4. Column (1) presents the association between levels of depression and the growth of occupational hourly wage of the 1992 survey-occupation from 1999 (the first year with available OEWS data) to the age-50 health module. The occupations held in 1992 by people with more severe levels of depression at ages 27-35 experienced substantially lower wage growth over time. Column (2) presents the association between depression and the average number of hours worked per year between the 1992 survey and age-50 health module. People with more severe depression at ages 27-35 averaged fewer hours worked each year. Column (3) presents the association between depression and years of education gained

between the 1992 survey and age-50 health module. The difference is not of a meaningful magnitude.

To examine the effect of the persistence or recurrence of depression, we break apart the timing of depression, by constructing indicators of whether an individual has experienced a single episode (at either 27-35, 40 or 50) of any kind of depression (mild, moderate, or severe); versus having multiple times where depression was present through age 50 (two or three times). For bivariate associations between different timings of depression and human capital accumulation, see Table E2 of the appendix.

Table 5 reports the OLS regression results on log of annual wage income at age 50, with and without controls for future depression and human capital accumulation. Column (1) does not include future depression or human capital accumulation. In this specification, depression at ages 27-35 significantly decreases annual wage income at age 50 by 21% to 23%. In column (2), we add controls for depression at age 40 and 50. Compared to column (1), the coefficient for early mild to moderate depression decreases by 21% and the coefficient for severe depression decreases even larger, by 39%. In column (3), we add controls for human capital accumulation. Compared to column (1), the coefficient estimate for early mild to moderate depression declines by 25% and that for early severe depression declines by 55%. In column (4), we control for both future depression and human capital accumulation. Together, these controls lead the coefficient of age 27-35 depression to fall by 40%-81%. These results suggest that a substantial portion of the impact of early-adulthood depression on subsequent annual wage income, especially among those with severe depression, can be explained by the impact of early-adulthood depression on the decrement in human capital and on the persistence of depression.

Next, we examine more specifically how the timing of depression affects outcomes. Table 6 reports OLS regression results on log of annual wage income, with and without controls on the timing of depression and human capital accumulation. To simplify interpretation, we

combine mild/moderate and severe depression; columns 1 and 2 report analyses analogous to prior results for the combined measure. Columns 3 and 4 report results where new depression measures are created to better represent the timing of depression. As can be seen from column (3), both one-time depression at ages 27-35 and at age 50 are significantly associated with income loss at age 50 (about 17% for pre-age 36 depression and 28% for age-50 depression). Recurrent depression leads to even larger income losses. For people experiencing depression at ages 27-35, recurring depression around age 40 results in an approximately 22% drop in future income and recurring depression around age 50 results in an approximately 41% drop in future income. The largest penalty on income comes from having depression in all three age periods, which results in a 71% income loss.

Comparison of column (1) to (3) also reveals some interesting results. Column (1) shows that having depression at ages 27-35 is associated with a 16% decline in annual wage income. This magnitude is like having pre-age 36 depression only in column (3). The result is quite different for depression around age 40. In column (1), it results in a significant income loss of 13%. However, from column (3), we can infer from the reduced, statistically insignificant coefficient that this negative impact is due to recurring depression around age 40 or later, instead of a one-time depression at age 40. In column (4), we combine estimates of the effects of recurrent depression with the human capital effects from Table 5. From column (3) to column (4), adding human capital accumulation reduces the coefficients on recurrent depression by more than those for one-time depression. The coefficient of having pre-age 36 depression only is reduced by 24% but having depression at ages 27-35 alone still causes a significant income loss of 13%.

VII. Discussion

We find strong evidence that depression in early adulthood has a negative impact on labor market outcomes over the life course. Part of this negative impact can be attributed to early

depression's disruption of human capital accumulation. At age 50, people who experience depression at ages 27-35 have accumulated lower levels of non-routine cognitive analytical and interpersonal skills. Their occupations at ages 27-35 see less wage growth in subsequent years and, at age 50, they are employed in occupations with substantially lower average wages. Early adulthood depression also has a negative effect on subsequent labor market outcomes because depression experienced early in life, as currently managed, frequently recurs or persists into later life. Thus, at age 50, people with early depression are less likely to be employed and more likely to drop out of the labor market and receive disability benefits. If employed, workers with depression at ages 27-35 earn lower hourly wages at age 50, even conditional on their occupations.

We validate the importance of these pathways by exploring the relationship between depression at ages 27-35 and annual wage income at age 50. When we take into consideration the measurable decrement of human capital alone (through reduced experience and occupation-specific skills), the impact of depression at ages 27-35 on annual wage income at age 50 is reduced by 25% to 55%; when we account for the higher risk of future depression alone, the direct impact of depression at ages 27-35 is reduced by 21%-39%. Together, these pathways contribute to between 40%-81% of the total impact of early adulthood depression on future annual wage income.

The significant negative impact we find of early-adulthood depression on income and employment at age 50 is consistent with Hakulinen et al (2019). Hakulinen et al. (2019), however, study adolescent depression and their results emphasize the impact of depression on human capital accumulation in school. Our analyses focus on early-adulthood depression and reveals its impact on human capital accumulation in the labor market.

Our results suggest that without appropriate treatments and supports, people with depression face great adversity participating in the labor market and risk being trapped in occupations with stagnant pay that are less likely to benefit from skill-biased technological

change. Clinical research has shown that depression can be effectively treated. Our results highlight the importance of relapse prevention to reduce recurrence and persistence of illness.

Our results also suggest that providing appropriate treatment and supports for people with depression would likely enable them to maintain a connection to the labor market that our results indicate is potentially important for subsequent outcomes. Previous studies have found that employment promotes improved well-being for people with depression and other significant mental illnesses (Bond et al. 2001; Hamilton, Merrigan, and Dufresne 1997). Without employment or a good-quality job, depression may become more severe, spurring a cycle of adverse labor market outcomes, and worsening mental health. A potential form of support is life-long vocational training, helping people with depression develop and upgrade their skill sets so they can achieve success in a constantly changing labor market environment.

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Table 1. Descriptive Statistics
(ordered according to restriction on employment status and sample size)

Variable	N	Mean/Percentage	Std. Dev
Not Conditional on Employment			
Employment Status During Age-50 Health Module	7193		
Not Employed		26.73%	0.44
Employed		73.27%	0.44
Level of Depression At ages 27-35	7193		
No Depression		82.73%	0.38
Mild to Moderate Depression		13.44%	0.34
Severe Depression		3.82%	0.19
Level of Depression During Age-40 Health Module	7193		
No Depression		85.79%	0.35
Mild to Moderate Depression		10.26%	0.30
Severe Depression		3.95%	0.19
Level of Depression During Age-50 Health Module	7193		
No Depression		82.84%	0.38
Mild to Moderate Depression		12.01%	0.33
Severe Depression		5.14%	0.22
Age During Age-50 Health Module	7193	49.84	0.90
Female	7193	51.93%	0.50
Black	7193	30.59%	0.46
Hispanic	7193	19.24%	0.39
Level of Education by Age 26	7193		
Less Than High School		16.21%	0.37
High School Graduate		44.45%	0.50
Some College		22.40%	0.42
College Graduate		11.97%	0.32
Post-Graduate		4.55%	0.21
Missing		0.43%	0.07
Education of Mother	7193		
Less Than College		77.66%	0.42
College Graduate and Beyond		15.90%	0.37
Missing		6.44%	0.25
Education of Father	7193		
Less Than College		64.99%	0.48
College Graduate and Beyond		20.06%	0.40

Missing		14.95%	0.36
Marital Status in 1992	7193		
Not Married		46.09%	0.50
Married		53.91%	0.50
Years of Work Experience by 1992	7113	8.88	3.98
Health During Childhood	7193		
Excellent		52.45%	0.50
Very Good		26.61%	0.44
Good		13.61%	0.34
Fair		3.57%	0.19
Poor		1.18%	0.11
Missing		2.57%	0.16
Cigarettes Smoked by 1992	7193		
Less Than 100 Cigarettes		49.30%	0.50
At Least 100 Cigarettes		46.07%	0.50
Missing		4.63%	0.21
Average Percentage of Weeks Work Experience Cannot be Accounted For by 1992	7193	0.65%	2.29
Disability Payment Receipt During Age-50 Health Module	6852		
Do Not Receive Disability Payment		90.16%	0.30
Receive Disability Payment		9.84%	0.30
Conditional on Employment			
Non-Routine Cognitive Analytical Score During Age-50 Health Module	6466	9.20	1.75
Non-Routine Cognitive Interpersonal Score During Age-50 Health Module	6466	9.44	1.63
Routine Cognitive Score During Age-50 Health Module	6466	3.29	1.01
Routine Manual Score During Age-50 Health Module	6466	7.46	1.99
Non-Routine Manual Physical Score During Age-50 Health Module	6466	9.49	3.02
Occupational Hourly Wage During Age-50 Health Module (In 1992 Dollars)	6255	14.81	8.99
Number of Hours Worked Per Year During Age-50 Health Module	5602	2018.11	744.57
Actual Hourly Wage During Age-50 Health Module (In 1992 Dollars)	5463	18.20	34.49
Annual Wage Income During Age-50 Health Module	5106	34718.66	36145.02

(In 1992 Dollars)

Table 2. Effects of Mental Health Status At ages 27-35 on Outcomes at Age 50
(conditional on employment except for the results on employment status and disability payment)

	Employed (logit marginal effect)	Disability Payment (logit marginal effect)	Log of Occupational Hourly Wage	Log of Own Hourly Wage, controlling for Occupational Wage	Annual Hours Worked	Log of Annual Wage Income
Mild to Moderate Depression At ages 27-35	-0.052***	0.031***	-0.057***	-0.100***	-118.795***	-0.239***
	(0.0145)	(0.0108)	(0.0159)	(0.0279)	(31.6947)	(0.0502)
Severe Depression At ages 27-35	-0.097***	0.047**	-0.079***	-0.083	-180.078***	-0.261***
	(0.0266)	(0.0200)	(0.0282)	(0.0639)	(65.0766)	(0.0872)
Number of Observations	7193	6852	6255	5463	5602	5106

Notes: * p<0.1, **p<0.05, ***p<0.01. Robust standard errors in parentheses. All columns include individual, family and environmental controls. Individual controls include age, gender dummy, race dummies, dummies for education at age 26, a dummy for marital status in 1992, work experience by 1992, the average percentage of weeks the person's work history data is missing, dummies for health status during childhood, a dummy for smoking behavior in 1992 and missing data indicators. Family controls include dummies on parental education and missing data indicators. Environmental controls include year dummies, local unemployment rate in 1992, 1998, 2004 and the year outcome variable is collected, and missing data indicators. The sample for the hourly wages and hours worked analyses include those with positive hourly wages and number of hours worked. The sample for the annual wage income analysis includes those with positive income. See appendix D for more details on sample design.

Table 3. Effects of Mental Health Status At ages 27-35 on Occupational Characteristics at Age 50

	Non-Routine Cognitive Analytical Score	Non-Routine Cognitive Interpersonal Score	Routine Cognitive Score	Routine Manual Score
Mild to Moderate Depression At ages 27-35	-0.143**	-0.061	-0.030	0.0207
	(0.0573)	(0.0547)	(0.0390)	(0.0662)
Severe Depression At ages 27-35	-0.152	-0.194**	-0.158**	0.0068
	(0.1030)	(0.0971)	(0.0708)	(0.1162)
Number of Observations	6466	6466	6466	6466

Notes: * p<0.1, **p<0.05, ***p<0.01. Robust standard errors in parentheses. All columns include individual, family and environmental controls. Individual controls include age, gender dummy, race dummies, dummies for education at age 26, a dummy for marital status in 1992, work experience by 1992, the average percentage of weeks the person's work history data is missing, dummies for health status during childhood, a dummy for smoking behavior in 1992 and missing data indicators. Family controls include dummies on parental education and missing data indicators. Environmental controls include year dummies, local unemployment rate in 1992, 1998, 2004 and the year outcome variable is collected, and missing data indicators. Job skill scores data are constructed from O*NET. The sample for the skill-composition analysis are those in the NLSY who report an occupation. See appendix D for more details on sample design.

Table 4. Accumulation of Human Capital, Stratified by Level of Depression (conditional on employment)

	(1) Average Percentage △ in Occupational Hourly Wage Per Year From 1999 to Age-50 Health Module (of 1992 Occupation) (in 1992 Dollars) *	(2) Average Number of Hours Worked Per Year Between the 1992 Survey and Age-50 Health Module **	(3) Average Years of Education Gained Between the 1992 Survey and Age-50 Health Module***
Level of Depression At ages 27-35			
No Depression	20.24%	2041.44	0.02
Mild to Moderate Depression	18.06%	1906.67	0.02
Severe Depression	14.43%	1780.29	0.03
Level of Depression During Age-40 Health Module			
No Depression	19.92%	2037.21	0.02
Mild to Moderate Depression	19.59%	1884.69	0.03
Severe Depression	17.26%	1766.16	0.02
Level of Depression During Age-50 Health Module			
No Depression	20.13%	2047.77	0.02
Mild to Moderate Depression	17.79%	1838.08	0.03
Severe Depression	16.71%	1662.02	0.03

Notes: * The number of this column is calculated as the percentage change from 1999-hourly wage to age-50 hourly wage, divided by the number of years between 1999 and the age-50 module.

** The number of this column is calculated as the total number of hours worked between the 1992 survey and age-50 module, divided by the number of years between the 1992 survey and the age-50 module.

*** The number of this column is calculated as the difference in years of education between 1992 survey and age-50 module, divided by the number of years between the 1992 survey and age-50 module.

Table 5. Effects of Mental Health Status At ages 27-35 on Annual Wage Income at Age 50- Human Capital Effect and Persistent Effect (conditional on employment)

	(1)	(2) Adding Controls for Future Depression at Age 40 or 50	(3) Adding Controls for Human Capital Accumulation	(4) All controls Added
Mild to Moderate Depression At ages 27-35	-0.213***	-0.168***	-0.159***	-0.128***
	(0.0506)	(0.0499)	(0.0458)	(0.0456)
Severe Depression At ages 27-35	-0.233***	-0.143*	-0.104	-0.044
	(0.0863)	(0.0858)	(0.0822)	(0.0819)
Mild to Moderate Depression During Age-40 Health Module		-0.119**		-0.064
		(0.0528)		(0.0485)
Severe Depression During Age-40 Health Module		-0.123		-0.016
		(0.0868)		(0.0829)
Mild to Moderate Depression During Age-50 Health Module		-0.279***		-0.225***
		(0.0597)		(0.0546)
Severe Depression During Age-50 Health Module		-0.510***		-0.393***
		(0.1138)		(0.1012)
Additional Years of Education Between Age 26 and Age-50 Health Module			0.103***	0.103***
			(0.0099)	(0.0098)
Work Experience Between the 1992 Survey and Age-50 Health Module			0.101***	0.098***
			(0.0065)	(0.0065)
Tenure During Age-50 Health Module			0.011***	0.010***
			(0.0014)	(0.0014)
Non-Routine Cognitive Analytical Score During Age-50 Health Module (of Occupation in 1992)			0.079***	0.079***
			(0.0137)	(0.0136)
Non-Routine Cognitive Interpersonal Score During Age-50 Health Module			-0.028*	-0.027*

(of Occupation in 1992)				
			(0.0144)	(0.0144)
Routine Cognitive Score During Age-50 Health Module (of Occupation in 1992)			0.049***	0.051***
			(0.0150)	(0.0149)
Routine Manual Score During Age-50 Health Module (of Occupation in 1992)			-0.006	-0.006
			(0.0113)	(0.0113)
Non-routine Manual Physical Score During Age-50 Health Module (of Occupation in 1992)			-0.00004	-0.0003
			(0.0076)	(0.0076)
Log of Occupational Hourly Wage During Age-50 Health Module (of Occupation in 1992)			0.050***	0.051***
			(0.0138)	(0.0137)
Number of Observations	4913	4913	4913	4913

Notes: * p<0.1, **p<0.05, ***p<0.01. Robust standard errors in parentheses. All columns include individual, family and environmental controls. Individual controls include age, gender dummy, race dummies, dummies for education at age 26, a dummy for marital status in 1992, work experience by 1992, the average percentage of weeks the person's work history data is missing, dummies for health status during childhood, a dummy for smoking behavior in 1992 and missing data indicators. Family controls include dummies on parental education and missing data indicators. Environmental controls include year dummies, local unemployment rate in 1992, 1998, 2004, and the year outcome variables is collected, and missing data indicators.

Table 6. Effects of Mental Health Status At ages 27-35 on Annual Wage Income at Age 50- Timing Effect and Human Capital Effect (conditional on employment)

	(1)	(2) Adding controls for Human Capital Accumulation		(3)	(4) Adding controls for Human Capital Accumulation
Have Depression At ages 27-35	-0.160***	-0.109***	Have Depression Only At ages 27-35	-0.166***	-0.126 ***
	(0.0448)	(0.0414)		(0.0517)	(0.0482)
Have Depression During Age-40 Health Module	-0.125***	-0.056	Have Depression Only During Age-40 Health Module	-0.064	-0.0001
	(0.0464)	(0.0431)		(0.0499)	(0.0498)
			Have Depression Only During Age-50 Health Module	-0.282***	-0.230 ***
				(0.0707)	(0.0647)
			Have Depression At ages 27-35 and During Age-40 Health Module	-0.219**	-0.091
				(0.1114)	(0.0941)
			Have Depression At ages 27-35 And During Age-50 Health Module	-0.407***	-0.239 **
				(0.1189)	(0.1071)
			Have Depression During Age-40 and Age-50 Health Module	-0574***	-0.422 ***
				(0.1189)	(0.1064)
Have Depression During Age-50 Health Module	-0.325***	-0.256***	Have Depression At ages 27-35, During Age-40 and Age-50 Health Module	-0.708***	-0.541 ***
	(0.0540)	(0.0490)		(0.161)	(0.1448)
Additional Years of Education Between Age 26 and Age-50 Health Module		0.103***			0.103 ***
		(0.0098)			(0.0098)

Work Experience Between the 1992 Survey and Age-50 Health Module	0.098***	Work Experience Between the 1992 Survey and Age-50 Health Module	0.098***
	(0.0065)		(0.0065)
Tenure During Age-50 Health Module	0.010***	Tenure During Age-50 Health Module	0.010 ***
	(0.0014)		(0.0014)
Non-Routine Cognitive Analytical Score During Age-50 Health Module (of Occupation in 1992)	0.079***	Non-Routine Cognitive Analytical Score During Age-50 Health Module (of Occupation in 1992)	0.079 ***
	(0.0136)		(0.0136)
Non-Routine Cognitive Interpersonal Score During Age-50 Health Module (of Occupation in 1992)	-0.027*	Non-Routine Cognitive Interpersonal Score During Age-50 Health Module (of Occupation in 1992)	-0.027 *
	(0.0144)		(0.0144)
Routine Cognitive Score During Age-50 Health Module (of Occupation in 1992)	0.050***	Routine Cognitive Score During Age-50 Health Module (of Occupation in 1992)	0.050 ***
	(0.0149)		(0.0150)
Routine Manual Score During Age-50 Health Module (of Occupation in 1992)	-0.005	Routine Manual Score During Age-50 Health Module (of Occupation in 1992)	-0.006
	(0.0113)		(0.0114)
Non-Routine Manual Physical Score During Age-50 Health Module (of Occupation in 1992)	-0.0004	Non-Routine Manual Physical Score During Age-50 Health Module (of Occupation in 1992)	0.00005
	(0.0076)		(0.0076)
Log of Occupational Hourly Wage During Age-50 Health Module (of Occupation in 1992)	0.051***	Log of Occupational Hourly Wage During Age-50 Health Module (of Occupation in 1992)	0.051 ***
	(0.0137)		(0.0136)

Number of Observations	4913	4913	Number of Observations	4913	4913

Notes: * p<0.1, **p<0.05, ***p<0.01. Robust standard errors in parentheses. All columns include individual, family and environmental controls. Individual controls include age, gender dummy, race dummies, dummies for education at age 26, a dummy for marital status in 1992, work experience by 1992, the average percentage of weeks the person's work history data is missing, dummies for health status during childhood, a dummy for smoking behavior in 1992 and missing data indicators. Family controls include dummies on parental education and missing data indicators. Environmental controls include year dummies, local unemployment rate in 1992, 1998, 2004, and the year outcome variables is collected, and missing data indicators.

Online Appendix A. Finding CES-D 7-Item Cutoff Scores

In order to find the CES-D 7-item cutoff scores that distinguish depression of different severities, we first researched on the appropriate cutoff scores for the CES-D 20-item score. The following CES-D 20-item cutoff is used in Hsu and Marshall (1987) to differentiate depression of different levels: No depression (0-15 points), Mild to Moderate Depression (16-30 points), Severe Depression (31-60 points). Then, we used receiver operating characteristics analysis (ROC analysis) to find the corresponding CES-D 7-item cutoff scores. To conduct the analysis, we need both the CES-D 20-item and the 7-item test scores. In the NLSY79 dataset, the 1992 survey is the only one that includes both scores. 3,755 survey respondents are dropped for missing either score, so the ROC analysis is based on 8,931 respondents. In Table A1, we show the ROC output that helps us find the CES-D 7-item score that corresponds with the CES-D 20-item cutoff for no depression versus have depression (>=16). It turns out that the cutoff score of 8(>=8) has the highest percentage of correctly classified cases. Thus, we consider people that score 0-7 points on CES-D 7-item test as not depressed, while those scoring 8-21 points as depressed.

In Table A2, we show the ROC output that helps us find the CES-D 7-item cutoff that best corresponds to the CES-D 20-item cutoff of with or without severe depression (>=31). It turns out that (>=14) has the highest percentage of correctly classified cases. Thus, we consider people that score at least 14 on CES-D 7-item test as severely depressed.

We did not find the cutoff for mild depression and moderate depression. Thus, we combine the two depression levels together and consider people that score from 8-13 points as having mild to moderate depression. In conclusion, we adopt the following cutoff scores for

CES-D 7-item score: No Depression (0-7 points), Mild to Moderate Depression (8-13 points), Severe Depression (14-21 points).

Online Appendix B. Construction of Job Skill Scores and Extra Regression Result on Job Skill Scores

In order to merge NLSY79 occupations with job skill scores constructed from 2008-2016 O*NET data, all census occupation codes in NLSY79 and SOC occupation codes in O*NET are cross-walked to occupation codes in the Census 2002 classification system. O*NET scores are weighted onto Census 2002 occupation codes. For a number of NLSY79 occupations with missing O*NET scores, we use linear interpolation and extrapolation to generate scores for them. If scores are still missing, we replace them with the average scores of the major Census 2002 occupation category they belong to.

Table B1 shows the coefficients from regressions on non-routine manual physical score.

Online Appendix C. Construction of Occupational Hourly Wage

In order to merge NLSY79 occupations with average hourly wage data from 2008-2016 OEWS data, all census occupation codes in NLSY79 and SOC occupation codes in O*EWS are cross-walked to occupation codes in the Census 2002 classification system. Occupational hourly wages are weighted onto Census 2002 codes.

Online Appendix D. Sample Design and Variable Construction

Local unemployment rate: To create the local unemployment rate measure, we begin with the census region the person lives in during year X. For people whose census region in year X is missing, we assume that the person lives in region A if the person lives in region A before and after year X. Then, for all census regions, we collect monthly unemployment rates that are

seasonally unadjusted from the Bureau of Labor Statistics. Annual unemployment rate is then approximated by the average of the 12 monthly unemployment rates.

Work experience: The measure is calculated by adding the total number of weeks a person had worked in every survey since age 18 through the 1992 survey together and dividing by 52 (assuming there are 52 weeks in a year). For a few people who turned age 18 before 1979, data on the number of weeks worked before 1979 is missing. Following Zavodny (2003), we replace the missing value with the product of average number of weeks worked in 1978 by people that turned age 18 in 1978 and the number of years the value is missing, as well as a variable to flag the share of weeks in which we cannot account for work status.

Disability payment: If the respondent fails to answer the disability payment question, other disability-payment-related questions are collected and analyzed (ex: the number of months the person/the person's spouse receives disability payment during the last year). Since 2016 was the last year that questions on disability payment were administered, for people that participated in the module in 2016, we can only collect their disability payment status reported for the year 2015. While creating the disability payment sample, 5,484 people are dropped for missing value on depression variables. 350 people are dropped for a missing value on disability payment status. The final sample contains 6,852 people.

Occupational hourly wage: In the sample used for the analysis of occupational hourly wage, 5,484 people are dropped for missing value on depression variables, and 947 are dropped for missing occupational hourly wage and extreme values (likely mis-coded), such as an hourly wage greater than 1000 dollars per hour. This yields a final sample of 6,255 people.

For analyses of age-50 outcomes other than employment status and receipt of disability payments (such as hours worked), we only analyze individuals who are employed. For age-50

outcomes on disability payment status, annual wage income and annual hours worked, which as mentioned above are reported for the past calendar year, if a respondent participates in the age-50 module in year t, we collect outcome data from year t+1 or the nearest subsequent year when it becomes available.

Hours worked: In the sample used for the analysis of annual hours worked, 5,484 people are dropped because they have missing value for depression variables, 1,600 people are dropped because of missing value on hours worked (including those with zero hours worked) or hours worked more than 4,200 hours worked per year (twice the amount of hours of working at two full-time jobs). The final sample contains 5,602 people.

Annual wage income: In creating the annual wage income sample, 5,484 people are dropped for missing depression variables. 2,096 people are dropped for missing income data (including those with zero income). The final sample contains 5,106 people.

Online Appendix E. Construction of Sample for the Analyses on Mechanisms of Early Adult Depression and Results of Analyses

To create the sample for the analysis of annual wage income while controlling for human capital accumulation, we exclude any missing value observations (including those with zero-value income) on annual wage income and any missing value observations on depression indicators in 1992, age 40 and age 50 health module. For this sample, 5,484 people are dropped for missing depression variables, 2,096 people are dropped for missing value (including zero-value) on annual wage income. 24 people are dropped because the year their data on occupational hourly wage is collected from is too far away apart from the year their annual wage income is collected from (seven or nine years apart). 169 people are dropped for missing both job-skill scores and occupational hourly wage. The final sample includes 4,913 people.

Table E1 shows the summary statistics of the sample we use to validate the two potential pathways of depression in early adulthood. To construct the age-50 job skill scores of the 1992 occupation, we first collect data on the person's main occupation during the 1992 survey. If missing, we collect the main occupation from the 1991, 1993, 1994 or 1996 survey. Occupations during these survey years are documented in the Census 1970 occupation codes. Then, we collect O*NET data from 2008-2016. To ensure that we can match NLSY79 occupations with O*NET data, all census occupation codes in NLSY79 and SOC occupation codes in O*NET are cross-walked to OCC1990 codes created by IPUMS. For a number of occupations with missing O*NET scores, we use linear interpolation and extrapolation to generate scores for them. If still missing, we replace the missing score with the score of a similar OCC 1990 occupation. For a list of OCC1990 occupations who take on the score of similar OCC 1990 occupations see Table G3. Tenure on the main occupation during age-50 module is created based on the NLSY79 variables on tenure associated with the main job during a specific year. We collect tenure from the same year the person participates in the age-50 health module or the nearest subsequent year when data becomes available. To construct the age-50 occupational hourly wage of the 1992 occupation, we use the 1992-occupations we have collected for the measure on age-50 job skill scores of 1992-occupations. Then, we collect average hourly wages from 2008-2016 OEWS data of Bureau of Labor Statistics. To ensure that we can assign the occupational hourly wages onto the occupations, all census occupation codes in NLSY79 and SOC occupation codes in OEWS are cross-walked to OCC1990 codes created by IPUMS. If occupational hourly wage is missing from OEWS, we replace the missing value with the occupational hourly wage of the 2-digit SOC occupation codes that the occupation code belongs to. If an OCC1990 occupation is still missing hourly wage, then we replace it with the hourly wage of a similar OCC1990 occupation (See

Table E3 for a list of these occupations). We use the same method to assign occupational hourly wage from 1999 OEWS data onto the 1992-occupation of NLSY79.

Work experience between the 1992 survey and age-50 health module is generated by adding the total number of weeks worked starting from the 1993 survey until the year during the age-50 module the person's income data is collected together and dividing by 52.

Online Appendix F. Cross Tabulation Between Early Depression, Contemporaneous Depression and Outcomes of Interest

Tables F1-F10 show bivariate association of early depression/contemporaneous depression with various outcomes

Online Appendix G. Sensitivity Analysis on Controls for Early Childhood and Family Background

Table G1 shows the coefficients from our sensitivity analysis on controls for early childhood and family background

Online Appendix H. Results on Effect of Depression At ages 27-35 on Outcomes at Age 50, with Control for Future Depression

Table H1 and H2 repeats the analyses in Table 2, adding controls for future depression at age 40 and 50.

Appendix

Table A1. ROC Analysis Table--Cutoff for Having Depression

Observation	ROC Area	Standard Error	95% Confidence Interval	
8931	0.9492	0.0026	(0.94411	0.95437)

Cutoff	Sensitivity	Specificity	Correctly Classified	Positive Likelihood Ratio	Negative Likelihood Ratio
(>= 0)	100.00%	0.00%	21.03%	1.00	
(>= 1)	99.84%	23.32%	39.41%	1.30	0.01
(>= 2)	99.47%	37.27%	50.35%	1.59	0.01
(>= 3)	98.62%	51.33%	61.27%	2.03	0.03
(>= 4)	97.12%	67.77%	73.94%	3.01	0.04
(>= 5)	94.41%	78.18%	81.59%	4.33	0.07
(>= 6)	89.78%	86.54%	87.22%	6.67	0.12
(>= 7)	79.93%	93.02%	90.27%	11.46	0.22
(>= 8)	69.12%	96.54%	90.77%	19.98	0.32
(>= 9)	57.93%	98.30%	89.81%	34.05	0.43
(>= 10)	47.23%	99.32%	88.37%	69.40	0.53
(>= 11)	38.29%	99.73%	86.81%	142.12	0.62
(>= 12)	30.24%	99.94%	85.29%	533.26	0.70
(>= 13)	23.80%	99.97%	83.95%	839.55	0.76
(>= 14)	18.80%	99.99%	82.91%	1300.00	0.81
(>= 15)	14.16%	99.99%	81.94%	998.66	0.86
(>= 16)	10.60%	100.00%	81.20%		0.89
(>= 17)	7.77%	100.00%	80.61%		0.92
(>= 18)	5.43%	100.00%	80.11%		0.95
(>= 19)	3.09%	100.00%	79.62%		0.97
(>= 20)	1.81%	100.00%	79.35%		0.98
(>= 21)	0.75%	100.00%	79.13%		0.99
(> 21)	0.00%	100.00%	78.97%		1.00

Table A2. ROC Analysis Table--Cutoff for Having Severe Depression

Observation	ROC Area		Standard Error	95% Confidence Interval	
8931	0.9907		0.0012	(0.98827	0.99315)
Cutoff	Sensitivity	Specificity	Correctly Classified	Positive Likelihood Ratio	Negative Likelihood Ratio
(>= 0)	100.00%	0.00%	4.37%	1.00	
(>= 1)	100.00%	19.30%	22.82%	1.24	0.00
(>= 2)	100.00%	30.90%	33.92%	1.45	0.00
(>= 3)	100.00%	42.69%	45.19%	1.74	0.00
(>= 4)	100.00%	56.60%	58.49%	2.30	0.00
(>= 5)	100.00%	65.79%	67.28%	2.92	0.00
(>= 6)	100.00%	73.72%	74.86%	3.80	0.00
(>= 7)	99.74%	81.22%	82.03%	5.31	0.00
(>= 8)	99.23%	86.48%	87.03%	7.34	0.01
(>= 9)	98.21%	90.34%	90.68%	10.17	0.02
(>= 10)	97.18%	93.49%	93.65%	14.93	0.03
(>= 11)	95.90%	95.74%	95.75%	22.50	0.04
(>= 12)	91.03%	97.46%	97.18%	35.83	0.09
(>= 13)	85.64%	98.65%	98.09%	63.61	0.15
(>= 14)	74.62%	99.26%	98.19%	101.16	0.26
(>= 15)	60.26%	99.63%	97.91%	160.83	0.40
(>= 16)	47.44%	99.84%	97.55%	289.40	0.53
(>= 17)	35.90%	99.93%	97.13%	510.98	0.64
(>= 18)	25.90%	99.99%	96.75%	2200.00	0.74
(>= 19)	14.87%	100.00%	96.28%		0.85
(>= 20)	8.72%	100.00%	96.01%		0.91
(>= 21)	3.59%	100.00%	95.79%		0.96
(> 21)	0.00%	100.00%	95.63%		1.00

Table B1. Coefficients from Regressions on Non-Routine Manual Physical Score (conditional on employment)

	(1)	(2)	(3)	(4)
Mild to Moderate Depression At ages 27-35	-0.010	-0.059	-0.057	-0.093
	(0.0915)	(0.0929)	(0.0915)	(0.0927)
Severe Depression At ages 27-35	0.291*	0.190	0.226	0.150
	(0.1655)	(0.1689)	(0.1658)	(0.1688)
Mild to Moderate Depression During Age-40 Health Module		0.185*		0.139
		(0.1094)		(0.1098)
Severe Depression During Age-40 Health Module		0.333*		0.283
		(0.1775)		(0.1772)
Mild to Moderate Depression During Age-50 Health Module		0.073		0.056
		(0.1020)		(0.1021)
Severe Depression During Age-50 Health Module		0.271*		0.220
		(0.1515)		(0.1534)
R-Square	0.293	0.294	0.302	0.303
Adjusted R-Square	0.292	0.292	0.298	0.298
Number of Observations	6466	6466	6466	6466

Notes: * p<0.1, **p<0.05, ***p<0.01. Robust standard errors in parentheses. All columns include individual, family and environmental controls. Individual controls include age, gender dummy, race dummies, dummies for education at age 26, a dummy for marital status in 1992, work experience by 1992, the average percentage of weeks the person's work history data is missing, dummies for health status during childhood, a dummy for smoking behavior in 1992 and missing data indicators. Family controls include dummies on parental education and missing data indicators. Environmental controls include year dummies, local unemployment rate in 1992, 1998, 2004 and the year outcome variables is collected, and missing data indicators.

Table E1. Summary Statistics(N=4913)

Variable	Mean/Percentage	Std. Dev
Conditional on Employment		
Annual Wage Income During Age-50 Health Module (in 1992 Dollars)	34984.83	36301.93
Level of Depression At ages 27-35		
No Depression	85.85%	0.35
Mild to Moderate Depression	11.24%	0.32
Severe Depression	2.91%	0.17
Level of Depression During Age-40 Health Module		
No Depression	89.82%	0.30
Mild to Moderate Depression	7.78%	0.27
Severe Depression	2.40%	0.15
Level of Depression During Age-50 Health Module		
No Depression	88.21%	0.32
Mild to Moderate Depression	9.36%	0.29
Severe Depression	2.42%	0.15
Have Depression Only At ages 27-35		
No	91.08%	0.28
Yes	8.92%	0.28
Have Depression Only During Age-40 Health Module		
No	94.89%	0.22
Yes	5.11%	0.22
Have Depression Only During Age-50 Health Module		
No	93.57%	0.25
Yes	6.43%	0.25
Have Depression At ages 27-35 and During Age-40 Health Module		
No	98.27%	0.13
Yes	1.73%	0.13
Have Depression At ages 27-35 and During Age-50 Health Module		
No	97.98%	0.14
Yes	2.02%	0.14
Have Depression During Age-40 and Age-50 Health Module		
No	98.15%	0.13
Yes	1.85%	0.13
Have Depression At ages 27-35, During Age-40		

and Age-50 Health Module		
No	98.51%	0.12
Yes	1.49%	0.12
Non-Routine Cognitive Analytical Score During Age-50 Health Module (of Occupation in 1992)	9.07	1.66
Non-Routine Cognitive Interpersonal Score During Age-50 Health Module (of Occupation in 1992)	9.14	1.39
Routine Cognitive Score During Age-50 Health Module (of Occupation in 1992)	3.44	0.98
Routine Manual Score During Age-50 Health Module (of Occupation in 1992)	7.63	2.03
Non-Routine Manual Physical Score During Age-50 Health Module (of Occupation in 1992)	9.65	2.80
Work Experience Between 1992 Survey and Age-50 Health Module (In Years)	17.16	3.87
Tenure During Age-50 Health Module (In Years)	10.31	8.97
Occupational Hourly Wage During Age-50 Health Module (of Occupation in 1992) (in 1992 Dollars)	51.96	72.25
Level of Education by Age 26		
Below High School	12.05%	0.33
High School Graduate	43.13%	0.50
Some College	23.86%	0.43
College Graduate	14.59%	0.35
Post-Graduate	5.68%	0.23
Missing	0.69%	0.08
Years of Education Accumulated Since Age 26	0.62	1.24

Table E2. Accumulation of Human Capital, Stratified by Level of Depression (conditional on employment)

	(1) Average Percentage △ in Occupational Hourly Wage Per Year From 1999 to Age-50 Module (of 1992 Occupation) (in 1992 Dollars) *	(2) Average Number of Hours Worked Per Year Between 1992 and Age-50 Module **	(3) Average Years of Education Gained Between 1992 and Age-50 Module***
Have Depression Only At ages 27-35			
No	20.13%	2022.38	0.02
Yes	16.76%	1981.73	0.02
Have Depression Only During Age-40 Health Module			
No	19.76%	2020.82	0.02
Yes	21.09%	1980.64	0.02
Have Depression Only During Age-50 Health Module			
No	20.06%	2029.17	0.02
Yes	16.43%	1867.10	0.03
Have Depression At ages 27-35 and During Age-40 Health Module			
No	19.92%	2023.63	0.02
Yes	14.34%	1743.12	0.03
Have Depression At ages 27-35 and During Age-50 Health Module			
No	19.83%	2024.92	0.02
Yes	19.86%	1721.38	0.02
Have Depression During Age-40 and Age-50 Health Module			
No	19.89%	2023.30	0.02
Yes	16.52%	1779.10	0.02
Have Depression At ages 27-35 , During Age-40			

and Age-50 Health Module			
No	19.81%	2024.19	0.02
Yes	20.65%	1653.21	0.04

Notes: * The number of this column is calculated as the percentage change from 1999-hourly wage to age-50 hourly wage, divided by the number of years between 1999 and the age-50 module.

** The number of this column is calculated as the total number of hours worked between the 1992 survey and age-50 module, divided by the number of years between the 1992 survey and the age-50 module.

*** The number of this column is calculated as the difference in years of education between 1992 survey and age-50 module, divided by the number of years between the 1992 survey and age-50 module.

Table E3. OCC1990 Codes with Missing Job Skill Scores and Their Score Replacement

OCC1990 Code with Missing Job Skill Scores	Occupation Title	OCC1990 Code Whose Scores Are Used for Replacement	Occupational Title
128	Math instructors	154	Subject instructors (HS/college)
213	Electrical and electronic (engineering) technicians	214	Engineering technicians, n.e.c.
215	Mechanical engineering technicians	214	Engineering technicians, n.e.c.
349	Other telecom operators	348	Telephone operators
387	Teacher's aides	389	Administrative support jobs, n.e.c.
407	Private household cleaners and servants	405	Housekeepers, maids, butlers, stewards, and lodging quarters cleaners
438	Food counter and fountain workers	439	Kitchen workers
538	Office machine repairers and mechanics	539	Repairers of mechanical controls and valves

653	Tinsmiths, coppersmiths, and sheet metal workers	649	Engravers
717	Fabricating machine operators, n.e.c.	719	Molders, and casting machine operators
735	Photoengravers and lithographers	734	Printing machine operators, n.e.c.
789	Hand painting, coating, and decorating occupations	785	Assemblers of electrical equipment
796	Production checkers and inspectors	799	Graders and sorters in manufacturing
877	Stock handlers	878	Machine feeders and offbearers

Table F1. Employment Status, Stratified by Gender and Level of Depression in 1992 (at ages 27-35)

Level of Depression in 1992	1992	1998	2004	2010	2016	Percentage Point △
Male						
No Depression	88.61%	90.06%	87.31%	78.89%	74.22%	-14.39%
Mild to Moderate Depression	70.46%	77.01%	76.38%	61.85%	57.45%	-13.01%
Severe Depression	51.69%	65.06%	67.53%	55.95%	56.34%	4.65%
Female						
No Depression	71.61%	77.95%	77.02%	73.32%	69.46%	-2.15%
Mild to Moderate Depression	61.05%	69.41%	67.25%	62.08%	55.49%	-5.56%
Severe Depression	46.74%	62.07%	57.71%	46.63%	45.45%	-1.29%
Overall						
No Depression	80.15%	84.01%	82.14%	76.10%	71.83%	-8.32%
Mild to Moderate Depression	64.66%	72.22%	70.56%	61.99%	56.23%	-8.43%
Severe Depression	48.35%	63.04%	60.71%	49.62%	48.73%	0.38%

Table F2. Employment Status, Stratified by Gender and Level of Contemporaneous Depression

Current Level of Depression	1992-1996	Age 40-Health Module Pooled (1998-2006)	Age-50 Health Module Pooled (2008-2016)	Percentage Point △
Male				
No Depression	88.56%	88.69%	81.79%	-6.77%
Mild to Moderate Depression	70.35%	67.50%	47.08%	-23.27%
Severe Depression	52.22%	45.16%	29.27%	-22.95%
Female				
No Depression	71.60%	79.62%	75.66%	4.06%
Mild to Moderate Depression	61.07%	65.05%	57.09%	-3.98%
Severe Depression	46.49%	47.12%	33.60%	-12.89%
Overall				
No Depression	80.14%	84.15%	78.74%	-1.40%
Mild to Moderate Depression	64.63%	65.99%	53.12%	-11.51%
Severe Depression	48.36%	46.48%	32.16%	-16.20%

Table F3. Disability Payment Recipiency Status, Stratified by Gender and Level of Depression in 1992 (at ages 27-35)

Level of Depression in 1992	1993	1999	2005	2011	2015	Percentage Point △
Male						
No Depression	3.48%	2.82%	4.07%	7.37%	11.31%	7.83%
Mild to Moderate Depression	7.56%	5.57%	6.19%	8.98%	16.98%	9.42%
Severe Depression	11.69%	2.86%	10.53%	14.67%	9.86%	-1.83%
Female						
No Depression	5.16%	4.28%	4.71%	7.56%	11.29%	6.13%
Mild to Moderate Depression	7.09%	6.40%	5.78%	10.77%	19.52%	12.43%
Severe Depression	9.83%	13.61%	11.76%	16.18%	21.34%	11.51%
Overall						
No Depression	4.32%	3.56%	4.39%	7.46%	11.30%	6.98%
Mild to Moderate Depression	7.27%	6.09%	5.94%	10.10%	18.58%	11.31%
Severe Depression	10.40%	10.46%	11.38%	15.73%	17.87%	7.47%

Table F4. Disability Payment Recipiency Status, Stratified by Gender and Level of Contemporaneous Depression

Current Level of Depression	1993-1997	Age 40-Health Module Pooled (1998-2006)	Age-50 Health Module Pooled (2008-2016)	Percentage Point △
Male				
No Depression	3.53%	3.1%	7.43%	3.90%
Mild to Moderate Depression	7.39%	7.89%	18.32%	10.93%
Severe Depression	11.39%	9.76%	24.11%	12.72%
Female				
No Depression	5.10%	3.83%	8.31%	3.21%
Mild to Moderate Depression	7.33%	8.03%	16.24%	8.91%
Severe Depression	9.71%	8.29%	25.21%	15.50%
Overall				
No Depression	4.32%	3.46%	7.87%	3.55%
Mild to Moderate Depression	7.35%	7.88%	17.05%	9.70%
Severe Depression	10.24%	8.78%	24.86%	14.62%

Table F5. Median of Actual Hourly Wage (in 1992 dollars), Stratified by Gender and Level of Depression in 1992 (at ages 27-35)

Level of Depression in 1992	1992	1998	2004	2010	2016	Percentage △
Male						
No Depression	7.34	6.89	5.94	5.43	4.97	-32.29%
Mild to Moderate Depression	6.71	6.89	5.68	5.47	4.38	-34.72%
Severe Depression	6.9	6.89	5.34	5.15	5.41	-21.59%
Female						
No Depression	6.6	6.22	5.81	5.38	5.14	-22.12%
Mild to Moderate Depression	6	6	5.55	5.15	4.97	-17.17%
Severe Depression	6.02	6	5.46	5.25	5.3	-11.96%
Overall						
No Depression	7	6.46	5.94	5.38	5.12	-26.86%
Mild to Moderate Depression	6.25	6.03	5.57	5.15	4.82	-22.88%
Severe Depression	6.25	6.05	5.46	5.21	5.34	-14.56%

Table F6. Median of Actual Hourly Wage (in 1992 dollars), Stratified by Gender and Level of Contemporaneous Depression

Current Level of Depression	1992-1996	Age 40-Health Module Pooled (1998-2006)	Age-50 Health Module Pooled (2008-2016)	Percentage △
Male				
No Depression	7.28	6.24	13.51	85.58%
Mild to Moderate Depression	6.55	5.94	9.78	49.31%
Severe Depression	6.73	6.54	8.86	31.65%
Female				
No Depression	6.41	5.94	10.39	62.09%
Mild to Moderate Depression	5.94	5.94	8.04	35.35%
Severe Depression	5.89	5.94	7.09	20.37%
Overall				
No Depression	6.90	6.03	11.85	71.74%
Mild to Moderate Depression	6.05	5.94	8.42	39.17%
Severe Depression	6.08	6.10	7.63	25.49%

Table F7. Average Annual Hours Worked, Stratified by Gender and Level of Depression in 1992 (at ages 27-35)

Level of Depression in 1992	1993	1999	2005	2011	2015	Percentage △
Male						
No Depression	2211.76	2343.52	2265.71	2260.27	2177.94	-1.53%
Mild to Moderate Depression	2130.02	2332.37	2200.53	2168.72	2132.62	0.12%
Severe Depression	1940.73	2059.46	1956.44	2009.18	1842.29	-5.07%
Female						
No Depression	1826.6	1955.11	1945.23	1975.86	1941.28	6.28%
Mild to Moderate Depression	1743.91	1934.96	1824.23	1829.05	1783.83	2.29%
Severe Depression	1575.92	1969.46	1796.24	1924.02	1909.28	21.15%
Overall						
No Depression	2030.46	2157.85	2111.77	2121.62	2062.2	1.56%
Mild to Moderate Depression	1900.74	2086.08	1968.3	1958.95	1917.58	0.89%
Severe Depression	1678.17	1999.46	1846.89	1950.12	1886.77	12.43%

Table F8. Average Annual Hours Worked, Stratified by Gender and Level of Contemporaneous Depression

Current Level of Depression	1993-1997	Age 40-Health Module Pooled (1998-2006)	Age-50 Health Module Pooled (2008-2016)	Percentage △
Male				
No Depression	2185.51	2258.40	2190.23	0.22%
Mild to Moderate Depression	2084.66	2148.25	1918.46	-7.97%
Severe Depression	1885.60	2081.60	2056.76	9.08%
Female				
No Depression	1755.13	1918.88	1911.64	8.92%
Mild to Moderate Depression	1672.25	1764.06	1740.28	4.07%
Severe Depression	1564.39	1794.52	1469.38	-6.07%
Overall				
No Depression	1976.42	2091.06	2053.98	3.92%
Mild to Moderate Depression	1834.73	1910.96	1806.61	-1.53%
Severe Depression	1665.16	1873.64	1626.78	-2.30%

Table F9. Median of Annual Wage Income (in 1992 dollars), Stratified by Gender and Level of Depression in 1992 (at ages 27-35)

Level of Depression in 1992	1993	1999	2005	2011	2015	Percentage △
Male						
No Depression	27186.16	33685.47	34482.34	46184.27	46892.29	72.49%
Mild to Moderate Depression	21360.55	25264.11	28735.28	32736.5	33833.35	58.39%
Severe Depression	17476.82	20211.29	21910.65	26767.99	25687.58	46.98%
Female						
No Depression	18447.75	21053.42	22506.91	27300.56	28592.3	54.99%
Mild to Moderate Depression	14758.2	18527.01	18677.93	22991.06	22350.96	51.45%
Severe Depression	12470.68	17684.87	17959.55	17769.99	22302.09	78.84%
Overall						
No Depression	23188.34	26948.38	28735.28	37068.51	38041.8	64.06%
Mild to Moderate Depression	17476.82	21053.42	21551.46	26709.2	26801.31	53.35%
Severe Depression	14564.01	18572.01	18677.93	20615.51	23471.63	61.16%

Table F10. Median of Annual Wage Income (in 1992 dollars), Stratified by Gender and Level of Contemporaneous Depression

Current Level of Depression	1993-1997	Age 40-Health Module Pooled (1998-2006)	Age-50 Health Module Pooled (2008-2016)	Percentage △
Male				
No Depression	25244.29	32787.50	32703.96	29.55%
Mild to Moderate Depression	19418.69	23766.23	20930.54	7.79%
Severe Depression	15605.83	21776.53	18469.87	18.35%
Female				
No Depression	15534.95	21455.88	22237.39	43.14%
Mild to Moderate Depression	12622.15	17428.57	17006.06	34.73%
Severe Depression	8054.50	14655.84	10208.17	26.74%
Overall				
No Depression	20389.62	26687.50	26822.20	31.55%
Mild to Moderate Depression	14564.01	19969.85	18064.38	24.03%
Severe Depression	11651.21	16379.11	12427.51	6.66%

Table G1. Effects of Mental Health Status At ages 27-35 on Outcomes at Age 50, with and without Control for Early Childhood and Family Background

Employed (logit marginal effect)					
	(1) All Controls Included	(2) No Control for Early Childhood and Family Background	(3) No Control for Depression At ages 27-35	(4) No Control for Future Depression at Age 40 or 50, or Early Childhood and Family Background	(5) No Control for Future Depression at Age 40 or 50
Mild to Moderate Depression At ages 27-35	-0.017 (0.0138)	-0.023 (0.0140)		-0.061 *** (0.0147)	-0.052 *** (0.0145)
Severe Depression At ages 27-35	-0.013 (0.0239)	-0.023 (0.0244)		-0.117 *** (0.0271)	-0.097 *** (0.0266)
Mother Has College Education	-0.011 (0.0162)		-0.011 (0.0162)		-0.012 (0.0168)
Father Has College Education	0.001 (0.0150)		0.001 (0.0150)		-0.002 (0.0155)
Very Good Health in Childhood (Excellent Health as Base Category)	0.012 (0.0113)		0.012 (0.0113)		0.009 (0.0117)
100+ Cigarettes At ages 27-35	-0.040 *** (0.0102)		-0.040*** (0.0102)		-0.051 *** (0.0104)
Disability Payment (logit marginal effect)					
Mild to Moderate Depression At ages 27-35	0.015 (0.0102)	0.017 (0.0103)		0.034 *** (0.0110)	0.031 *** (0.0108)
Severe Depression At ages 27-35	0.013 (0.0169)	0.017 (0.0173)		0.055 *** (0.0208)	0.047 ** (0.0200)
Mother Has College Education	0.018 (0.0133)		0.018 (0.0133)		0.017 (0.0134)
Father Has College Education	-0.002 (0.0112)		-0.002 (0.0112)		0.001 (0.0115)
Very Good Health in Childhood (Excellent Health as Base Category)	-0.008 (0.0084)		-0.008 (0.0084)		-0.008 (0.0085)
100+ Cigarettes At ages 27-35	0.014 * (0.0075)		0.014* (0.0075)		0.017 ** (0.0076)
	(1)	(2)	(3)	(4)	(5)

	All Controls Included	No Control for Early Childhood and Family Background	No Control for Depression At ages 27-35	No Control for Future Depression at Age 40 or 50, or Early Childhood and Family Background	No Control for Future Depression at Age 40 or 50
Log of Occupational Hourly Wage					
Mild to Moderate Depression At ages 27-35	-0.049 *** (0.0161)	-0.050 *** (0.0161)		-0.059 *** (0.0159)	-0.057 *** (0.0159)
Severe Depression At ages 27-35	-0.061 ** (0.0286)	-0.064 ** (0.0287)		-0.084 *** (0.0283)	-0.079 *** (0.0282)
Mother Has College Education	0.016 (0.0188)		0.016 (0.0188)		0.016 (0.0189)
Father Has College Education	0.031 * (0.0180)		0.030 * (0.0180)		0.030 * (0.0180)
Very Good Health in Childhood (Excellent Health as Base Category)	-0.030 ** (0.0134)		-0.030** (0.0134)		-0.031 ** (0.0134)
100+ Cigarettes At ages 27-35	-0.008 (0.0119)		-0.009 (0.0119)		-0.010 (0.0119)
Log of Own Hourly Wage, controlling for Occupational Wage					
Mild to Moderate Depression At ages 27-35	-0.073 *** (0.0277)	-0.074 *** (0.0278)		-0.103 *** (0.0280)	-0.100 *** (0.0279)
Severe Depression At ages 27-35	-0.036 (0.0650)	-0.035 (0.0657)		-0.086 (0.0647)	-0.083 (0.0639)
Mother Has College Education	0.052 * (0.0299)		0.052* (0.0299)		0.052 * (0.0230)
Father Has College Education	0.036 (0.0271)		0.035 (0.0272)		0.033 (0.0273)
Very Good Health in Childhood (Excellent Health as Base Category)	-0.027 (0.0212)		-0.027 (0.0212)		-0.031 (0.0212)
100+ Cigarettes At ages 27-35	-0.040 ** (0.0189)		-0.042 ** (0.0189)		-0.046 ** (0.0189)
Annual Hours Worked					

	(1) All Controls Included	(2) No Control for Early Childhood and Family Background	(3) No Control for Depression At ages 27-35	(4) No Control for Future Depression at Age 40 or 50, or Early Childhood and Family Background	(5) No Control for Future Depression at Age 40 or 50
Mild to Moderate Depression At ages 27-35	-96.215 *** (31.9401)	-101.465 *** (31.8738)		-125.822*** (31.6493)	-118.795 *** (31.6947)
Severe Depression At ages 27-35	-137.493 ** (65.1370)	-137.375 ** (64.9130)		-182.881 *** (64.8374)	-180.078 *** (65.0766)
Mother Has College Education	-44.619 (30.5454)		-44.465 (30.4987)		-44.827 (30.7315)
Father Has College Education	1.057 (27.3593)		0.908 (27.3893)		-0.352 (27.4308)
Very Good Health in Childhood (Excellent Health as Base Category)	-46.856 ** (22.0356)		-46.259 ** (22.0488)		-51.836 ** (22.0575)
100+ Cigarettes At ages 27-35	-64.758 *** (20.2376)		-66.714*** (20.2744)		-69.439 *** (20.2417)
Log of Annual Wage Income					
Mild to Moderate Depression At ages 27-35	-0.190 *** (0.0497)	-0.195 *** (0.0496)		-0.248 *** (0.0501)	-0.239 *** (0.0502)
Severe Depression At ages 27-35	-0.161 * (0.0858)	-0.164 * (0.0857)		-0.2711 *** (0.0871)	-0.261 *** (0.0872)
Mother Has College Education	0.008 (0.0425)		0.007 (0.0425)		0.009 (0.0429)
Father Has College Education	0.049 (0.0389)		0.049 (0.0389)		0.046 (0.0393)
Very Good Health in Childhood (Excellent Health as Base Category)	-0.066 ** (0.0303)		-0.067** (0.0304)		-0.077 ** (0.0306)
100+ Cigarettes At ages 27-35	-0.070 ** (0.0286)		-0.075*** (0.0286)		-0.082 *** (0.0287)

Notes: * p<0.1, **p<0.05, ***p<0.01. Robust standard errors in parentheses.

Table H1. Effects of Mental Health Status At ages 27-35 on Outcomes at Age 50
(conditional on employment except for the results on employment status and disability payment)
(with control for future depression)

	Employed (logit marginal effect)	Disability Payment (logit marginal effect)	Log of Occupational Hourly Wage	Log of Own Hourly Wage, controlling for Occupational Wage	Annual Hours Worked	Log of Annual Wage Income
Mild to Moderate Depression At ages 27-35	-0.017	0.015	-0.049***	-0.073***	-96.215***	-0.190***
	(0.0138)	(0.0102)	(0.0161)	(0.0277)	(31.9401)	(0.0497)
Severe Depression At ages 27-35	-0.013	0.013	-0.061**	-0.036	-137.493**	-0.161*
	(0.0239)	(0.0169)	(0.0286)	(0.0650)	(65.1370)	(0.0858)
Mild to Moderate Depression During Age-40 Health Module	-0.072***	0.046***	-0.025	-0.086**	-66.837*	-0.142***
	(0.0164)	(0.0126)	(0.0196)	(0.0359)	(39.0570)	(0.0539)
Severe Depression During Age-40 Health Module	-0.080***	0.014	0.025	-0.061	-39.067	-0.186**
	(0.0267)	(0.0165)	(0.0319)	(0.0660)	(66.4962)	(0.0900)
Mild to Moderate Depression During Age-50 Health Module	-0.159***	0.056***	-0.044**	-0.140***	-113.599***	-0.274***
	(0.0168)	(0.0122)	(0.0179)	(0.0352)	(37.2000)	(0.0591)
Severe Depression During Age-50 Health Module	-0.310***	0.112***	-0.108***	-0.171***	-247.925***	-0.499***
	(0.0272)	(0.0206)	(0.0231)	(0.0499)	(72.4001)	(0.1092)

Number of Observations	7193	6852	6255	5463	5602	5106

Notes: * p<0.1, **p<0.05, ***p<0.01. Standard errors in parentheses for results on employment status and disability payment status. For all other outcomes robust standard errors are in parentheses. Both panels include individual, family and environmental controls. Individual controls include age, gender dummy, race dummies, dummies for education at age 26, a dummy for marital status in 1992, work experience by 1992, the average percentage of weeks the person's work history data is missing, dummies for health status during childhood, a dummy for smoking behavior in 1992 and missing data indicators. Family controls include dummies on parental education and missing data indicators. Environmental controls include year dummies, local unemployment rate in 1992, 1998, 2004, and the year outcome variables is collected, and missing data indicators.

Table H2. Coefficients from Regressions on Job-Skill Scores of the Age-50 Main Occupation (conditional on employment) (with control for future depression)

	Non-Routine Cognitive Analytical Score	Non-Routine Cognitive Interpersonal Score	Routine Cognitive Score	Routine Manual Score
Mild to Moderate Depression At ages 27-35	-0.119**	-0.027	-0.027	-0.011
	(0.0582)	(0.0557)	(0.0396)	(0.0674)
Severe Depression At ages 27-35	-0.116	-0.141	-0.161**	-0.045
	(0.1047)	(0.0989)	(0.0721)	(0.1196)
Mild to Moderate Depression During Age-40 Health Module	-0.083	-0.209***	-0.043	0.148*
	(0.0701)	(0.0636)	(0.0456)	(0.0807)
Severe Depression During Age-40 Health Module	-0.002	-0.066	-0.078	0.104
	(0.112)	(0.1058)	(0.0781)	(0.1308)
Mild to Moderate Depression During Age-50 Health Module	-0.112*	-0.055	0.023	0.086
	(0.0627)	(0.0616)	(0.0411)	(0.0729)
Severe Depression During Age-50 Health Module	-0.115	-0.174**	0.112	0.133
	(0.0919)	(0.0832)	(0.0722)	(0.1153)
Number of Observations	6466	6466	6466	6466

Notes: * p<0.1, **p<0.05, ***p<0.01. Robust standard errors in parentheses. All columns include individual, family and environmental controls. Individual controls include age, gender dummy, race dummies, dummies for education at age 26, a dummy for marital status in 1992, work experience by 1992, the average percentage of weeks the person's work history data is missing, dummies for health status during childhood, a dummy for smoking behavior in 1992 and missing data indicators. Family controls include dummies on parental education and missing data indicators. Environmental controls include year dummies, local unemployment rate in 1992, 1998, 2004, and the year outcome variables is collected, and missing data indicators.