Job Characteristics, Job Preferences, and Physical and Mental Health in Later Life*

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ABSTRACT

Existing research linking the SES health gradient with work primarily focuses on the precursors (educational attainment) and outcomes (income) of work, rather than asking how more diverse facets of work influence health and health disparities. Using four waves of data from the Wisconsin Longitudinal Study, we evaluate whether multiple measures of respondent job characteristics, respondent preferences for those characteristics, and their interaction substantially improve the fit of sociological models of men’s and women’s physical and mental health compared to traditional models using educational attainment, parental SES, and income. We find that non-wage job characteristics predict men’s and women’s physical and mental health outcomes, although we find only weak evidence that the degree to which one’s job accords with one’s job preferences matters for health. These findings expand our understanding of the SES health gradient, demonstrating how the manner and condition under which one works has long lasting impacts on wellbeing.
Research on the SES-health gradient consistently demonstrates that better educated and wealthier individuals have lower rates of morbidity and mortality compared to their less well-off peers (Elo 2009; Mullahy, Robert, and Wolfe 2004; National Center for Health Statistics 2011; Sorlie, Backlund, and Keller 1995). However, much of the research on inequality and health has focused on the precursors (educational attainment) and outcomes (income) of work, rather than asking how more diverse facets of work and remuneration may influence health and health disparities (e.g. Gakidou et al. 2010; Hill and Needham 2006; Kawachi and Kennedy 1999; Lynch et al. 2000; Pickett and Wilkinson 2015).

We argue that three key features of jobs and the labor market have the potential to influence health and enrich our understanding of the SES-health gradient. First, jobs vary on a large number of characteristics besides pay and prestige. Jobs differ in the generosity of their benefits, the safety and cleanliness of the workplace, the amount of physical activity involved, the degree and types of social interactions performed while on the job, the number of hours worked, the security of employment, and many other important characteristics. These non-wage amenities vary in their relationship to pay (Cousineau, Lacroix, and Girard 1992; Dale-Olsen 2006; Kalleberg, Reskin, and Hudson 2000; Viscusi 1978, 1993), suggesting that pay cannot merely substitute for the influence of work characteristics on health. Second, individuals vary in their preferences for jobs with different characteristics. This may be shaped by their background, education, gender, race, assessment of their abilities, and the opportunities available to them. Influenced by these preferences and assessments of available opportunities, workers apply for certain types of jobs and not others. Third, jobs and workers are matched in a two-sided search process in which workers seek certain types of jobs with certain types of traits and employers seek certain kinds of workers with certain types of education and experience. The outcome of
this two-sided matching process in part reflects an effort for both prospective employees and employers to identify, respectively, work and workers whose traits match their preferences.

Sociological research on work and the labor market has studied the two-sided matching process extensively (e.g. Boyd et al. 2013; Crawford and Knoer 1981; Reskin and Bielby 2005), but the lessons of this research have not been imported into research on the SES-health association. Paying heed to this process can enrich our understanding of health and work for two key reasons. First, job characteristics may impact health outcomes directly, in several ways. For instance, those whose employers offer generous health and retirement benefits are likely to be protected against the effects of health or income shocks, workers whose jobs are physically demanding may (all else equal) be less likely to become obese, and those with low job security or long hours may experience a great deal of work-related stress. Prior research supports this proposed connection between job characteristics and health (e.g. Brand et al. 2007; Li, Yang, and Cho 2006; Warren et al. 2004; Stansfeld et al. 1995), although much of this research has relied on cross-sectional research designs, limited work characteristic measures, and limited health indicators that do not consider both physical and mental health. In response, recent reviews have called for research examining more than one work characteristic at a time and utilizing longitudinal data (Burgard and Lin 2013; Elo 2009).

Second, workers in jobs with traits that are well matched to their preferences may derive health benefits from this alignment compared to those who do not, even when experiencing the same job characteristics. Two different social psychology theories—Runciman’s (1966) relative deprivation theory and Michalos’s (1985) multiple discrepancy theory—argue that dissatisfaction is the result of differences between what one desires and what one has. Research applying this perspective to the labor market by examining the gap between the work one desires
and the work in which one is employed has found that falling short of one’s desired work conditions is associated with lower psychological well-being (Carr 1997; Hardie 2014; Pisarik and Shoffner 2009) and lower job satisfaction (Hardie 2014; Kalleberg 1977). Given that stress is thought to constitute a major mechanism of the SES-health gradient (House 2001), the omission of this factor in this literature is somewhat surprising.

Using data from the Wisconsin Longitudinal Study (WLS), we build on the prior literature by investigating how the multifaceted nature of work improves our understanding of health inequality beyond traditional measurements of SES for a range of physical and mental health outcomes. Furthermore, we test whether the degree of worker-job congruity further improves models of health outcomes net of traditional stratification measures and a suite of occupational characteristics. We examine these relationships separately for men and women, because numerous studies demonstrate that gender is differentially associated with employment opportunities, job amenities, work preferences, and health (e.g., Budig 2002; Correll 2004; Eccles 1994; Glavin, Schieman, and Reid 2011; Krueger and Burgard 2011; O’Neill 2003; Reskin and Roos 1990; Ridgeway and Correll 2004).

Below, we review major tenets of the literatures on work environments, work preferences, and the SES-health gradient. We then discuss our measurement and model selection decisions and present our results. Our analysis strongly supports a role for diverse job characteristics in contributing to health outcomes in later life net of traditional SES measures. However, our results do not support a prominent role for interactions between preferences and outcomes in predicting the same health outcomes.

THEORETICAL BACKGROUND
Socioeconomic Status, Work Characteristics, and Health

Health disparities research has identified a gradient of health outcomes throughout the social hierarchy (e.g., Marmot, Shipley & Rose 1984; Marmot et al. 1991; Meyer, Castro-Schilo, and Aguilar-Gaxiola 2014; Phelan, Link, and Tehranifar 2010). This work shows that having a marginally better position in society—whether by income, occupation, education, etc.—at any point in the distribution has statistically beneficial physical and mental health effects. Socioeconomic status is clearly an important factor to consider in studies of the social conditions of health. Yet many of the explanations for the SES-health gradient—primarily highlighting the role of resources, environmental risk, and social factors—rely on assumed differences between the job characteristics of low- and high-earning workers. It is important to study the conditions of work, and variations in workers’ preferences for and experiences of them, as contextual factors in health.

Recent work has re-situated our understanding of social class as an occupation-based system in which individuals within occupations share cohesive class cultures through the processes of allocation, social conditioning, and institutionalization (Weeden and Grusky 2005, 2012). This approach situates work as a central part of individuals’ lived experiences and life chances. However, much of the macro-level research linking work to health outcomes has been limited to either asking how the precursors of work (e.g., educational attainment) and outcomes (e.g., income) of work influence health, rather than asking how work characteristics may themselves impact health (e.g. Gakidou et al. 2010; Hill and Needham 2006; Kawachi and Kennedy 1999; Lynch et al. 2000; Pickett and Wilkinson 2015).

Jobs offer pecuniary and non-pecuniary rewards, both of which can contribute to health and health disparities. In addition to pay, work can offer economic security through job stability
and fringe benefits, which offset other costs and protect against the economic impact of unplanned emergencies. Non-pecuniary rewards attached to jobs may also influence health.

Work conditions vary according to the setting and tasks required to complete the work; the non-essential rewards attached to positions in order to attract workers with the desired qualifications to apply for the position; and organizational characteristics influencing the authority structure, job security, and the nature of work supervision. These characteristics may matter for both physical and mental health outcomes. Jobs that are tiring, unclean, and dangerous may have a direct impact on health through the risk of accidents, injuries, and exposure to toxic substances (Clougherty, Souza, and Cullen 2010; Meyer, Castro-Schilo, and Aguilar-Gaxiola 2014). In addition, the stress associated with working in either dangerous or low control occupations may be associated with physical health outcomes, both because chronic stress induces cumulative wear and tear on the body (Juster, McEwen, and Lupien 2010; Thoits 2010) and because working in more stressful jobs is associated with insalubrious health behaviors (e.g. Kouvonen et al. 2005). Stress is also directly related to mental health (Pearlin 1999), and thus working in jobs with greater risk, lower control, and fewer opportunities for growth likely has an impact on workers’ mental health and wellbeing (Stansfeld and Candy 2006). Prior work has largely neglected estimating the associations between these job characteristics and health in population-based studies in favor of a simpler model of socioeconomic status, but job characteristics have the potential to contribute to our models of health and wellbeing over and above the impact of wages.

A few studies have examined associations between job characteristics and health, although with limitations. Research using the WLS, for example, has found that indices of physical and psychosocial job characteristics accounted for some of the observed SES-health
gradient (Brand et al. 2007; Warren et al. 2004). This research presents important evidence that variations in job characteristics impact health, but relies on cross-sectional associations and indexed measures of job characteristics and health. Another study using the WLS showed that, compared to working in a white collar job, working in a blue collar job in young adulthood is predictive of a host of worse health outcomes in middle adulthood (Fletcher 2011). Other research, using both cross-sectional and longitudinal data, supports the contention that job characteristics are predictive of mental health and wellbeing. For example, research by Stansfeld and colleagues found that job characteristics such as authority, control, and social support at work were associated with a lower risk of psychiatric disorder, both cross-sectionally and over time (Stansfeld et al. 1999; Stansfeld et al. 1995). Additional research using the WLS found that job authority was associated with changes in depression over time, although in opposite directions for men and women (Pudrovska and Karraker 2014). We build on the work in this area and test two hypotheses:

\[ H1a: \] Job characteristics will be associated with physical health outcomes, net of traditional SES measures.

\[ H1b: \] Job characteristics will be associated with mental health outcomes, net of traditional SES measures.

Our analyses expand on prior research by using multiple waves of data, considering a more complete set of job characteristics, and modeling a wide range of both physical and mental health outcomes.

**Work Characteristics, Work Preferences and Characteristic-Preference Discrepancies**

Job characteristics also vary in the degree to which they are valued by workers, and workers also vary in the cluster of characteristics they deem most important when judging jobs
(Daw and Hardie 2012; Halaby 2003), which may have important health consequences. The literature on the social psychology of work, expectations, and fulfillment suggests that the gap between work preferences and work characteristics may jointly influence health outcomes. For instance, Runciman’s (1966) relative deprivation theory argues that dissatisfaction stems from the gap between what an individual wants and has. Michalos’s multiple discrepancy theory (1985) also incorporates this perspective, suggesting that individuals’ satisfaction with life is dependent upon several comparisons, including the similarity (or lack thereof) between one’s goals and present circumstances. Research supports this view, showing that the gap between work-related expectations and outcomes leads to lower psychological wellbeing (Carr 1997, Hardie 2014, Pisarik and Shoffner 2009). Additionally, Kalleberg (1977) incorporated subjective preferences and outcomes into a study of job satisfaction, showing that preferences for job characteristics were negatively associated with job satisfaction, while job characteristics themselves were positively associated with job satisfaction. More generally, research has shown that a feeling of low personal control—which may be brought on or exacerbated by working in an undesirable job—is associated with psychological distress (Mirowsky and Ross 1989, Rosenfield 1989).

Combining this literature in social psychology with research on the importance of work for wellbeing suggests that the expectation-outcome gap may influence health outcomes through its relationship to stress. Research has shown that chronic stress undermines both physical and mental health over time (Kessler 1997; Pearlin 1989; Pearlin et al. 1981), and that it is related to forms of role strain, including (but not limited to) role captivity, or the condition of serving a role one would prefer to not undertake (Kessler 1997). Given the centrality of work settings and activities to people’s daily lives, we argue that the discomfort that arises from working in a job
one would prefer not to increases stress. Because chronic stress is strongly associated with men’s and women’s physical and mental health (e.g., Thoits 1995), we expect to find that those who lack job characteristics that they value will have lower health outcomes, on average. Therefore, we propose two hypotheses:

\[ H2a: \text{Working in jobs with characteristics an individual does not want (or has a lower preference for) will be negatively associated with physical health outcomes.} \]

\[ H2b: \text{Working in jobs with characteristics an individual does not want (or has a lower preference for) will be negatively associated with mental health outcomes.} \]

**Gender, Work, and Health**

Finally, research suggests that the relationship between work and health differs by gender. Work is marked by gender-differentiated sorting into jobs (Correll 2004; Eccles 1994; Reskin and Roos 1990; Ridgeway and Correll 2004), inequality in earnings (Budig 2002; O’Neill 2003), and inequality within households (Craig and Mullan 2010; Sayer 2005). Some research has shown that the association between work and physical health is weaker for women than men (Krueger and Burgard 2011; MacIntyre and Hunt 1997), but the association between work and mental health may be stronger for women (Glavin, Schieman, and Reid 2011). One study also found that job authority was differentially related to mental health for men and women; job authority was positively associated with depressive symptoms among women, but negatively associated among men (Pudrovcka and Karraker 2014). Given this prior research, it is important to assess the association between job characteristics and health separately for men and women.

The association between job characteristic preferences, outcomes, and health is also likely to vary by gender. Gender shapes preferences for job characteristics and the likelihood of
working in jobs that fulfill certain preferences (Correll 2004; Eccles 1994). Furthermore, the negative impact of a job characteristic preference-outcome mismatch may be lessened for women if they anticipate spending less time in the paid labor market. Alternatively, it may have a stronger association with health if the women who are working entered the paid labor force due to family need. For these reasons, we will examine the work-health association separately for men and women.

**DATA AND METHODS**

**Data**

We use data from the Wisconsin Longitudinal Survey (WLS) to assess the influence of diverse job characteristics and preference-characteristic interactions on physical and mental health outcomes in later life. The WLS has followed a randomly sampled one-third of all high school graduates from Wisconsin (N=10,317) since their graduation in 1957. These male and female, almost exclusively white, high school graduates were interviewed in 1957, 1964, 1975, 1992, 2004, and 2011. Although this sample is broadly representative of white high school graduates from their cohort, it is limited by its geographic, racial, and educational scope.

**Job Preferences Variables (1975)**

In 1975, when WLS participants were about age 35, they were asked about their preferences for 12 job characteristics on an ordinal (1= “not very important at all,” 2= “somewhat important” and 3= “very important”) scale: “How important is/are ____ in judging jobs in general?” These questions covered respondent preferences for: “the pay” (abbreviated pay) “the fringe benefits” (benefits) “how interesting the work is” (interesting), “how clean the work is” (clean) “how tiring the work is” (tiring), “the hours you work” (hours) “how highly
people regard the job” (prestige), “job security” (security), “the amount of freedom you have” (freedom), “not being under too much pressure” (pressure), “the chance to get ahead” (ahead), and “the chance to use your abilities” (abilities).

**Job Characteristics Variables (1992)**

In 1992, respondents rated their current jobs across numerous dimensions. We identified measures for twelve job characteristics that matched the job preferences from 1975. Data from the 1992 wave are ideal because we can use this year’s data to compare job characteristics years after respondents’ preferences were stated, but before most of the sample had retired from paid work. We measure all but one of these characteristics straightforwardly using survey items collected by the WLS. However, for our final measure, we used the educational requirements of a job as a proxy for the respondent’s chances to use abilities in his or her job. To capture this, we used a measure of the percentage of people in the 1970 census who held a similar job (matched by occupational census codes) and had completed at least one year of college.

**Traditional Measures of Attainment (1957, 1992)**

We also employ a set of four traditional measures of attainment and life chances, which we include in all regression models. First, we measure respondent education, measured by self-report, and placed in four categories – high school only (reference category), some college, a four-year college degree, and post-baccalaureate education. Second, we use a measure of respondents’ parental socioeconomic status in 1957, created by WLS staff as a factor-weighted measure of father’s years of schooling, mother’s years of schooling, and parental income. Third, we use the Nakao-Treas occupational prestige measure associated with respondents’ occupation in 1992. Finally, we use a measure of respondent yearly income in 1992. We compare the fit of
models that include job characteristic preferences and attributes, and the interaction between the two, against the fit associated with these independent variables.

**Health Outcomes**

We draw on a range of measures of physical and mental health outcomes measured in 1992 (when the respondents were approximately age 53), 2004 (age 65), and 2011 (age 72). Full measurement details are provided in Appendix A. We measure respondents’ self-rated health, functional limitations, number of days spent sick in bed (Bed Days), number of days spent in the hospital (Hospital Days), body mass index (BMI), number of health problems they selected from a list (Health Index), number of diagnosed illnesses selected from a list (Illnesses), the Physical Composite Scores of the SF-12 survey battery (PCSU), and self-reported status of being limited in the work they can perform by their health (Health Limitations). We also measure a number of measures of mental health status available in the WLS, including respondents’ number of lifetime depressive episodes (Depressive Episodes), depression using the CES-D scale (CES-D), recent depressive symptom counts (Depressive Symptoms), an index of hostility (Hostility) and an omnibus measure of mental health is captured using the Mental Composite Scores of the SF-12 survey (MCSU). We use these measures in all years that they are available.

**Methods**

We proceed with our analysis in four steps. First, we provide and discuss descriptive statistics for all variables used in our analysis. Second, we examine the results of a series of regression analyses of the set of physical and mental health outcomes discussed above. For each dependent variable, we estimate three nested models. We begin with a traditional attainment model incorporating respondent educational attainment, parental socioeconomic status,
respondent occupational prestige, and respondent yearly income in 1992 as independent variables (Model A). Next, we estimate a model that includes all job characteristics discussed above in addition to the traditional attainment variables (Model B). Finally, we estimate a model which includes all independent variables included in Model B as well as twelve job preference variables and twelve characteristic-preference interaction terms (Model C). Ordinary least squares regression is used to analyze non-count interval/ratio or ordinal (Self-Rated Health) dependent variables; negative binomial regression is used to analyze three count variables (Hospital Days, Bed Days, and Illnesses). We analyze some continuous dependent variables that were not clearly count variables using OLS on versions of the dependent variable transformed as $Y' = \ln(Y+1)$ (Health Limitations, Health Index, Depressive Episodes, Depressive Symptoms, and Functional Limitations). We model job characteristics as z-scores, and job preferences categorically (using “not very important” as the reference category) to avoid assuming linear effects.

Third, we compare the fit of nested models of the same dependent variables using F-tests for the joint significance of the added independent variables. In the first stage of this step, we perform F-tests for the job characteristics variables to identify the contribution of job characteristics to improvement in fit over standard SES measures. Similarly, we test for the value-added of preferences and preference-characteristic interactions by performing an F-test for the joint significance of these variables.

In the fourth stage of the analysis, we re-estimate all regression models using occupational fixed effects models. We do so to determine whether any improvements in fit are attributable to occupational sorting. If we find that job characteristics and characteristic-preference interactions substantially improve fit in the standard regressions but not in the fixed
effects regressions, these improvements in fit would be better attributed to selection into occupations rather than the effects of job characteristics and characteristic-preference interactions themselves.

RESULTS

Descriptive Statistics

Table 1 presents variable means and standard deviations for the traditional attainment, job characteristics, and job preferences variables employed in this analysis. A superscripted “a” next to the variable name indicates statistically significant gender differences. This table shows evidence of several gender differences in occupational outcomes and preferences, which motivated our stratified analysis. Men reported higher educational attainment, average income, benefits, level of interestingness, chances to get ahead, and occupational prestige, while women reported cleaner work environments, less tiring work, more job security, greater freedom, and shorter hours. We found no significant gender differences for time pressure and the chance to use abilities. Compared to men, women reported that interestingness, cleanliness, how tiring a job is, time pressure, and hours were more important when judging jobs; men placed greater emphasis on wages, benefits, prestige, freedom, and the chance to get ahead. We observed no gender differences for security and the chance to use one’s abilities, both of which are rated highly by members of both genders.

[Table 1 here]

Table 2 provides descriptive statistics on the dependent variables by gender and year. Not all dependent variables were available in every year, and not every case could be fully imputed in each year. Superscripted letters a through c indicate statistically significant gender differences

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in 1992, 2004, and 2011 respectively. Several health outcomes show consistent evidence of higher female morbidity across waves of the study, such as functional limitations, the health index, illnesses, CES-D, and Depressive Symptoms. In contrast, there is a statistically significant female advantage in MCSU as well, highlighting the importance of using multiple indicators of physical and mental health as well as the importance of stratifying the analysis by gender.

[Table 2 here]

**Regression Results: SF-12 Physical and Mental Health Components**

Our analyses consist of a large number of regression models (over 90). Accordingly, we cannot display our full set of results here. Thus, in Table 3, we show full regression results for the fully specified model of two dependent variables of interest – the physical and mental health components of the 2004 SF-12 survey instrument, fit separately for men and women using Models A, B, and C.

[Table 3 here]

Several features of these twelve models are noteworthy. First, even with the inclusion of a full set of job characteristics, preferences, and their interactions, traditional measures of attainment exert significant influence on physical health in later life, but less consistently for mental health (Model C). Higher educational attainment significantly predicts improved physical health for men and women, as does yearly income. Occupational prestige is a significant predictor of improved physical health for men only, and parental SES is not significantly associated with male or female physical health in later life net of other measures of socioeconomic status. When it comes to mental health outcomes in 2004, however, these measures are not as predictive; post-baccalaureate degrees are associated with worse mental
health for men in all models and for women in the fully specified model. Income and parental SES do not significantly predict this outcome for men or women. Occupational prestige is a significant predictor for both sexes in Model A.

Second, several job characteristics have statistically significant main effects on physical and mental health in Model B, but the patterns differ across the outcomes and gender groups. For men, income, benefits, cleanliness, prestige, security, and hours all positively predict physical health, while how tiring a job is and the chance to use one’s abilities were associated with worse physical health, net of other modeled factors. For women, income, cleanliness, security, and the chance to get ahead all positively predict this outcome in the fully specified model. The results predicting mental health status show that many characteristics predict mental health. For men, four characteristics’ are significantly associated with mental health: benefits, job security, time pressure, and the chance to get ahead; for women, mental health is associated with mostly the same job characteristics: benefits, job security, freedom, and the chance to get ahead.

Third, there is some modest evidence for an association between characteristic-preference interactions and health. Model C shows significant interactions between multiple preferences and associated job characteristics when predicting physical health. For instance, there is a negative interaction between very important ratings of cleanliness and cleanliness itself on physical health for men, a positive interaction between the use abilities metric and the somewhat important rating for mental health for men, a positive interaction between the use abilities metric and the somewhat important rating for mental health for men, and a positive interaction between the hours variable and the very important rating for mental health for men. Overall, though, in light of the number of tests being performed here, this is weak evidence in favor of this hypothesis for these outcomes.
Assessing Model Fit: Physical Health Outcomes

Table 4 reports the results of nested regression models A, B, and C for physical health outcomes in later life, comparing model fit between A and B (the “+ Characteristics” column) then B and C (the “+Preferences & Interactions” column), with and without fixed effects specifications. The results show that including controls for job characteristics are jointly significant predictors of a wide variety of physical health outcomes for both men and women. These job characteristics significantly improve fit for both men and women for every physical health outcome measured in 1992. In 2004, there are a few exceptions (men’s bed days and illnesses, women’s functional limitations), but otherwise the rule that job characteristics significantly improve the fit of these models holds. In 2011, there are four exceptions to this rule: BMI for men and women, bed days for women, and illnesses for men. Nonetheless, these measures improve model fit in 8 out of the 12 dependent variable/gender combinations tested.

This pattern is less strong, but still pronounced, when applied to fixed effects regressions for these same outcomes (on the right-hand side of Table 4). 8 out of 14 of these tests are significant for 1992 outcomes, as are 9 out of 14 in 2004, and 6 out of 12 for 2011. All of these results yield substantially more significant improvements in fit than we would expect if these were solely due to chance. Although space limitations prevent us from delving into the details of each of these results in the typical manner, these overall patterns give clear evidence that multidimensional job characteristics are a potentially important and largely ignored factor in the linkage between socioeconomic status and physical and mental health among aging adults.

[Table 4 here]

In contrast, job preferences and preference-outcome interactions add essentially nothing to the predictive power of Model B. Out of the 80 tests performed in the non-FE and FE versions
of the model for all 20 physical health outcome variables for both genders, only one had a statistically significant improvement in fit associated with adding the preference-characteristics interaction terms – BMI for men in 2004. Although it is possible that this is a real effect, when performing 80 tests of statistical significance, one would expect an average of four false positives with a type I error rate of .05. Therefore, there is little evidence to reject the cross-model null hypothesis that these terms add no improvement in fit to the model.

Assessing Model Fit: Mental Health Outcomes

Table 5 reports the results of a series of models predicting a set of mental health outcomes in later life for men and women. The inclusion of a more diverse set of job characteristics when predicting mental health outcomes in later life exerts a jointly significant effect in a majority of these models. For men and women, the effects of these characteristics are jointly significant for CES-D outcomes in 1992, 2004, and 2011; hostility outcomes in all three years for men and in 1992 and 2004 for women; and MCSU outcomes in 2004 and 2011. Additionally, this effect is significant for men, but not women, on depressive symptoms in 1992 and 2011. Overall, adding job characteristics to the model significantly improved fit in 17 out of 26 tests (65.4%) for non-FE models. The FE models replicate these findings except in the case of MCSU for women in 2011. Therefore, these results do not appear to be attributable to the effects of occupational sorting.

As with physical health outcomes, we find relatively little evidence in support of preference-characteristic interactions for mental health outcomes. In the non-FE models reported on the left hand side of Table 5, only 3 out of 26 tests yielded statistically significant evidence of improvement in model fit for mental health outcomes, and only two did so in the FE results reported on the right-hand side. These counts of significant results are higher than the number of
significant results expected under chance (2.6), so there is stronger evidence in favor of the preference-characteristic interaction hypothesis than was found for physical health outcomes. Therefore we conclude that there is weak or outcome-specific evidence in favor of the hypothesis that preference-characteristic interactions meaningfully contribute to mental health differences among aging adults.

[Table 5 here]

DISCUSSION AND CONCLUSION

Research on the SES-health gradient has revealed important associations between traditional measures of socioeconomic status and health. Less research has sought to specify the complex relationship between work as a multifaceted, daily set of experiences and health (except see Brand et al. 2007; Li, Yang, and Cho 2006; Warren et al. 2004; Stansfeld et al. 1995). Furthermore, research in this area has often included a limited set of work characteristics and a cross sectional frame, leading to calls for research examining a complex set of work characteristic and utilizing longitudinal data (Burgard and Lin 2013; Elo 2009; Juster, McEwen, and Lupien 2010; Thoits 2010). The current study answers that call, and contributes further to this literature by also examining how job characteristic preferences matter in the association between work and health.

First, we find that work characteristics are predictive of a wide range of physical and mental health outcomes after accounting for socioeconomic rewards associated with work. Specifically, we find that, for men, work characteristics are associated with thirteen of our nineteen physical health outcomes in our most stringent (FE) models (68.4%) and, for women, work characteristics are associated with nine of our nineteen physical health outcomes in FE models (63.2%). Furthermore, men’s work characteristics are associated with nine of thirteen
mental health outcomes in FE models (69.2%), and the same is true of six mental health outcomes (46.2%) among women. For both physical and mental health, associations between work characteristics and outcomes were not largely attributable to occupational sorting.

Second, our hypotheses regarding job characteristic preferences and outcomes were largely not supported. If the gap between what an individual wants and has leads to lower levels of satisfaction and wellbeing (Michalos 1985; Runciman 1966), this association appears not to contribute to physical and mental health outcomes. It is possible that a combined measure of the number of job characteristics preferred and obtained versus not obtained (e.g., a worker is employed in a job that fits 40% of his or her preferred characteristics vs. 60% of them) may do a better job of predicting health outcomes.

These findings contribute to the literature on work and health in several ways. First, we draw attention to how the context of work shapes health. We do not claim that traditional measures of life chances exert no effects on physical or mental health outcomes once expanded measures of job outcomes and preferences are incorporated into regression models. However we do claim that, in many cases, multidimensional job characteristics are independently associated with physical and mental health outcomes in ways that substantially improve the fit of our regression models. Given the equally strong evidence for the association between job characteristics and physical health and job characteristics and mental health, we argue that the overall association between work and health operates both through direct means (e.g., working conditions can create hazards for injury or exposure to toxins) and through indirect means (e.g., working conditions can contribute to stress, resulting in the deterioration of mental and physical health over time).
Second, we find that occupational sorting plays a surprisingly small role in explaining these outcomes. It appears that it is job amenities themselves, not the occupations they are attached to or the preferences that workers hold for them, that influences health outcomes. Insofar as these associations are causal, which we cannot test, this suggests that improving the conditions and amenities of work, rather than optimizing the labor market’s matching process, is the most promising means by which work could be used as a policy lever to improve health in later life.

Finally, these findings speak to the applicability of relative deprivation and multiple discrepancy theory to healthy aging. Although we find robust evidence that diverse job amenities contribute to workers’ physical and mental health, we find little persuasive evidence that preference and outcome congruity does the same. These results suggest that, insofar as gaps between what one has and one desires influence physical and mental wellbeing, these linkages may be relatively short-lived, eroding through the decades even as the impacts of job characteristics endure. Of course, it may be that workers respond to these gaps by seeking new employment that is better aligned with their preferences. It may also be that the role of preferences in this model is disadvantaged by its earlier period of measurement compared to occupational outcomes. This discrepancy is helpful to reduce concerns that worker rationalization of circumstances explains any associations, but it does add 17 additional years through which their effects must persist, during which time preferences and circumstances may change dramatically. Nonetheless, on the basis of our analysis, preference-outcome congruity plays a decidedly minor role in differentiating mental and physical health outcomes in later life.

Our analysis is subject to a number of limitations. Ideally, this investigation should be conducted using a nationally representative sample of workers. Only high school graduates were
eligible to be part of the WLS sample, which makes them members of a relatively advantaged population. As a result, our findings may not be replicated in all populations. Furthermore, the WLS sample is nearly entirely racially homogeneous, geographically restricted, and cohort bounded. Future research should confirm the importance of these associations with health outcomes from a more diverse dataset with appropriate measures.

Nonetheless, our findings provide support for a novel approach to the study of health inequality by bridging this literature with theory and research on the social psychology of work. By investigating a full set of job rewards, how these match individual preferences, and a wide range of physical and mental health outcomes, these findings suggest new ways in which psychological stress resulting from work processes may influence workers’ health in later life. In particular, we argue that researchers should pay greater heed to the daily experiences of work, in addition to the pecuniary rewards associated with work, when seeking to understand individual health and wellbeing.
NOTES

1 There are so few non-whites in the sample that the study does not include a race measure at all in the public-use data for fear of deductive disclosure.

2 http://www.ssc.wisc.edu/wlsresearch/about/description.php. Accessed 1/8/2013.

3 Three additional questions asked respondents about their preferences for co-workers, supervisors, and helping people, but there was no matching information about job characteristics for jobs held in the WLS data, so we do not use them in our analysis.

4 We view age 35 as an ideal age at which to measure job preferences. At this point in the life course, most men and women have acquired some job experience, which will have provided them with experience-based preferences on a range of job characteristics. Preferences measured in adolescence and young adulthood are typically unstable (Johnson 2002; Rindfuss, Cooksey, and Sutterlin 1999), and are likely based upon conjecture, rather than labor market experience.

5 The exact coding for each of the job outcome variables we employ is listed in Appendix A.

6 Since this is also used as a job trait, this only comes into play as a contributor to change in fit in the preference-characteristic interaction models described below.

7 Although this comparison would normally be performed using a likelihood ratio test or AIC/BIC comparisons, this is not feasible using multiply imputed data, and F-tests for joint significance are asymptotically equivalent.

8 Under the null hypothesis of random false positives, we would expect $40 \times .05 = 2$ significant results for these tests. Instead, there were 33 significant results for the non-FE models and 23 for the FE models. This result is extremely unlikely under the null hypothesis – in 40 binomial trials with $p=.05$, the probability of obtaining either 23 or 33 successes is $<0.000001$. 

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| Table 1: Socioeconomic, Occupational Outcome, and Occupational Preference Descriptive Statistics, by Gender and Survey Wave |
|-----------------------------|----------------|---------------|----------------|---------------|----------------|
|                            | Men            |               | Women          |               |               |
|                            | N   | Mean | S.D. | N   | Mean | S.D. | N   | Mean | S.D. | N   | Mean | S.D. | N   | Mean | S.D. | N   | Mean | S.D. |
| **Traditional Attainment**  |     |      |     |     |      |     |     |      |     |     |      |     |     |      |     |     |      |     |
| Education                  |     |      |     |     |      |     |     |      |     |     |      |     |     |      |     |     |      |     |
| High school only           | 3961 | 0.52 | 0.50 | 4175 | 0.63 | 0.48 | 3961 | 0.16 | 0.37 | 4175 | 0.16 | 0.37 | 3961 | 0.14 | 0.35 | 4175 | 0.12 | 0.33 |
| Some College               | 3961 | 0.16 | 0.37 | 4175 | 0.16 | 0.37 | 3961 | 0.14 | 0.35 | 4175 | 0.12 | 0.33 | 3961 | 0.18 | 0.38 | 4175 | 0.09 | 0.29 |
| College degree             | 3961 | 0.14 | 0.35 | 4175 | 0.12 | 0.33 | 3961 | 0.18 | 0.38 | 4175 | 0.09 | 0.29 | 3961 | 16.29 | 11.10 | 4175 | 16.04 | 11.07 |
| Grad/professional school a | 3961 | 0.18 | 0.38 | 4175 | 0.09 | 0.29 | 3961 | 16.29 | 11.10 | 4175 | 16.04 | 11.07 | 3961 | 16.29 | 11.10 | 4175 | 16.04 | 11.07 |
| Parental SES               |     |      |     |     |      |     |     |      |     |     |      |     |     |      |     |     |      |     |
| **Occupational Outcomes**  |     |      |     |     |      |     |     |      |     |     |      |     |     |      |     |     |      |     |
| Income a                   | 3961 | 0.39 | 1.17 | 4175 | -0.32 | 0.66 | 3961 | 0.19 | 0.90 | 4175 | -0.19 | 1.05 | 3961 | 0.11 | 1.02 | 4175 | -0.10 | 0.97 |
| Benefits a                 | 3950 | 0.19 | 0.90 | 4143 | -0.19 | 1.05 | 3942 | 0.20 | 0.96 | 4098 | -0.18 | 0.98 | 3952 | -0.13 | 1.08 | 4159 | 0.12 | 0.90 |
| Interesting a              | 3954 | -0.08 | 0.99 | 4163 | 0.07 | 1.01 | 3952 | -0.13 | 1.08 | 4159 | 0.12 | 0.90 | 3954 | -0.08 | 0.99 | 4163 | 0.07 | 1.01 |
| Security a                 | 3959 | 0.11 | 1.02 | 4175 | -0.10 | 0.97 | 3938 | -0.07 | 1.00 | 3947 | 0.03 | 0.97 | 3905 | -0.10 | 0.93 | 3793 | 0.11 | 0.99 |
| Freedom a                  | 3959 | 0.11 | 1.02 | 4175 | -0.10 | 0.97 | 3938 | -0.07 | 1.00 | 3947 | 0.03 | 0.97 | 3905 | -0.10 | 0.93 | 3793 | 0.11 | 0.99 |
| Time Pressure               | 3954 | 0.00 | 0.95 | 4159 | 0.00 | 1.04 | 3954 | 0.00 | 0.95 | 4159 | 0.00 | 1.04 | 3954 | 0.00 | 0.95 | 4159 | 0.00 | 1.04 |
| Ahead a                    | 3951 | 0.06 | 0.97 | 4152 | -0.05 | 1.02 | 3951 | 0.06 | 0.97 | 4152 | -0.05 | 1.02 | 3951 | 0.06 | 0.97 | 4152 | -0.05 | 1.02 |
| Use Abilities               | 3959 | 0.01 | 1.06 | 4175 | -0.01 | 0.94 | 3958 | -0.40 | 0.86 | 4157 | 0.38 | 0.97 | 3959 | 0.01 | 1.06 | 4175 | -0.01 | 0.94 |
| Hours a                    | 3958 | -0.40 | 0.86 | 4157 | 0.38 | 0.97 | 3958 | -0.40 | 0.86 | 4157 | 0.38 | 0.97 | 3958 | -0.40 | 0.86 | 4157 | 0.38 | 0.97 |
| **Occupational Preferences**|     |      |     |     |      |     |     |      |     |     |      |     |     |      |     |     |      |     |
| Wages a                    | 3939 | 2.17 | 0.61 | 3219 | 2.12 | 0.62 | 3939 | 2.30 | 0.67 | 3219 | 2.25 | 0.72 | 3939 | 2.80 | 0.44 | 3219 | 2.85 | 0.39 |
| Benefits a                 | 3939 | 2.30 | 0.67 | 3219 | 2.25 | 0.72 | 3939 | 2.80 | 0.44 | 3219 | 2.85 | 0.39 | 3939 | 1.62 | 0.70 | 3218 | 1.88 | 0.74 |
| Interesting a              | 3939 | 2.15 | 0.77 | 3219 | 2.11 | 0.79 | 3938 | 1.70 | 0.70 | 3218 | 2.00 | 0.73 | 3938 | 2.15 | 0.77 | 3219 | 2.11 | 0.79 |
| Security                   | 3939 | 2.51 | 0.66 | 3219 | 2.47 | 0.70 | 3939 | 2.47 | 0.63 | 3219 | 2.33 | 0.65 | 3939 | 2.83 | 0.75 | 3219 | 2.13 | 0.73 |
| Freedom a                  | 3939 | 2.47 | 0.63 | 3219 | 2.33 | 0.65 | 3939 | 2.83 | 0.75 | 3219 | 2.13 | 0.73 | 3939 | 2.56 | 0.62 | 3219 | 2.37 | 0.69 |
| Time Pressure a            | 3939 | 1.83 | 0.75 | 3219 | 2.13 | 0.73 | 3939 | 2.56 | 0.62 | 3219 | 2.37 | 0.69 | 3939 | 2.85 | 0.38 | 3219 | 2.84 | 0.40 |
| Ahead a                    | 3939 | 2.56 | 0.62 | 3219 | 2.37 | 0.69 | 3939 | 2.85 | 0.38 | 3219 | 2.84 | 0.40 | 3939 | 1.84 | 0.74 | 3219 | 2.41 | 0.69 |
| Use Abilities               | 3939 | 2.85 | 0.38 | 3219 | 2.84 | 0.40 | 3939 | 1.84 | 0.74 | 3219 | 2.41 | 0.69 | 3939 | 2.85 | 0.38 | 3219 | 2.84 | 0.40 |
| Hours a                    | 3939 | 1.84 | 0.74 | 3219 | 2.41 | 0.69 | 3939 | 2.85 | 0.38 | 3219 | 2.84 | 0.40 | 3939 | 1.84 | 0.74 | 3219 | 2.41 | 0.69 |

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a: Statistically significant (p ≤ 0.05) mean gender differences in the 1992 imputation.
SOURCE: Wisconsin Longitudinal Study of 1957
Table 2: Health Outcomes Descriptive Statistics, by Gender and Survey Wave

| Health Outcomes | 1992 | 2004 | 2011 | 1992 | 2004 | 2011 | 1992 | 2004 | 2011 | 1992 | 2004 | 2011 | 1992 | 2004 | 2011 |
|-----------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                 | N    | Mean | S.D. | N    | Mean | S.D. | N    | Mean | S.D. | N    | Mean | S.D. | N    | Mean | S.D. |
| **SRH**         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Men             | 3876 | 4.13 | 0.67 | 3242 | 3.77 | 0.98 | 2687 | 3.96 | 0.69 | 3969 | 4.16 | 0.68 | 3518 | 3.78 | 0.98 |
| Women           |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1992            | 2004 | 2011 |      |      |      |      |      |      |      |      |      |      |      |      |      |
| **Functional Limits** |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Men             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1992            | 2004 | 2011 |      |      |      |      |      |      |      |      |      |      |      |      |      |
| **Bed Days**    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Men             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1992            | 2004 | 2011 |      |      |      |      |      |      |      |      |      |      |      |      |      |
| **Hospital Days** |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Men             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1992            | 2004 | 2011 |      |      |      |      |      |      |      |      |      |      |      |      |      |
| **BMI**         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Men             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1992            | 2004 | 2011 |      |      |      |      |      |      |      |      |      |      |      |      |      |
| **Health Index** |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Men             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1992            | 2004 | 2011 |      |      |      |      |      |      |      |      |      |      |      |      |      |
| **Illnesses**   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Men             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1992            | 2004 | 2011 |      |      |      |      |      |      |      |      |      |      |      |      |      |
| **PCSU**        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Men             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1992            | 2004 | 2011 |      |      |      |      |      |      |      |      |      |      |      |      |      |
| **Health Limitations** |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Men             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1992            | 2004 | 2011 |      |      |      |      |      |      |      |      |      |      |      |      |      |
| **Mental Health Outcomes** |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Men             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1992            | 2004 | 2011 |      |      |      |      |      |      |      |      |      |      |      |      |      |
| **Depressive Episodes** |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Men             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1992            | 2004 | 2011 |      |      |      |      |      |      |      |      |      |      |      |      |      |
| **CES-D**       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Men             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1992            | 2004 | 2011 |      |      |      |      |      |      |      |      |      |      |      |      |      |
| **Hostility**   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Men             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1992            | 2004 | 2011 |      |      |      |      |      |      |      |      |      |      |      |      |      |
| **MCSU**        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Men             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1992            | 2004 | 2011 |      |      |      |      |      |      |      |      |      |      |      |      |      |
| **Depressive Symptoms** |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Men             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1992            | 2004 | 2011 |      |      |      |      |      |      |      |      |      |      |      |      |      |

NOTE: Letters indicate statistically significant mean gender differences – a for 1992, b for 2004, c for 2011.

SOURCE: Wisconsin Longitudinal Study of 1957
|                      | PCSU 2004 |                      | MPCSU 2004 |                      |                      |                      |
|----------------------|-----------|----------------------|------------|----------------------|----------------------|----------------------|
|                      | Men (N=3,136) | Women (N=2,629) | Men (N=3,685) | Women (N=3,511) |                      |                      |
|                      | [A]          | [B]          | [C]          | [A]          | [B]          | [C]          | [A]          | [B]          | [C]          | [A]          | [B]          | [C]          |
| Education            |             |             |             |             |             |             |             |             |             |             |             |             |
| HS Only (Ref.)       |             |             |             |             |             |             |             |             |             |             |             |             |
| Sm College           | 1.448***     | 1.247**       | 1.231**      | -0.586      | -0.632      | -0.672      | -0.378      | -0.470      | -0.563      | -0.336      | -0.435      | -0.532      |
| Coll. Deg.           | 1.856***     | 1.718***      | 1.511**      | 2.021***     | 2.442***     | 2.340***     | -0.396      | -0.452      | -0.564      | -0.527      | -0.684      | -0.902*     |
| Post-BA              | 1.855***     | 2.118***      | 2.026***     | 1.903**      | 2.721***     | 2.266**      | -0.735*     | -0.795*     | -0.825*     | -0.733      | -0.934      | -1.293**    |
| Par. SES             | -0.0178      | -0.0598      | -0.100       | 0.0910       | -0.0331      | -0.0723      | -0.00447    | 0.0167      | 0.00886     | 0.123       | 0.0516      | 0.0208      |
| Income               | 0.628***     | 0.519***      | 0.830***     | 0.778**      | 0.641*       | -0.274       | 0.0896      | 0.0195      | 0.0462      | 0.225       | 0.191       | 0.312       |
| Prestige             |             |             |             |             |             |             |             |             |             |             |             |             |
| Pref.=Somewhat       |             |             |             | 0.302       | -0.832      |             |             |             |             |             |             |             |
| Pref.=Very           |             |             |             | 0.138       | -1.259      |             |             |             |             |             |             |             |
| Int. xSomewhat       | -0.462       |             | 1.140       | -0.374      | 0.915       |             |             |             |             |             |             |             |
| Int. xVery           | -0.374       |             |             | -0.374      | 0.915       |             |             |             |             |             |             |             |
| Benefits             | 0.494**      | 0.652**      | 0.713       | 0.272       | 0.177       | 0.270       | 0.350**     | 0.150       | 0.0651      | 0.340**     | 0.266       | 0.0100      |
| Pref.=Somewhat       |             |             |             | 0.404       | 1.146**     |             |             |             |             |             |             |             |
| Pref.=Very           |             |             |             | 0.603       | 1.183*      |             |             |             |             |             |             |             |
| Int. xSomewhat       | -0.0784      |             | -0.725      | -0.374      | 0.915       |             |             |             |             |             |             |             |
| Int. xVery           | -0.374       |             |             | -0.374      | 0.915       |             |             |             |             |             |             |             |
| Interesting          | 0.316*       | -0.270       | 0.323       | 0.763       |             |             | 0.227*      | 0.316       |             | -0.335**    | -0.588*     |             |
| Pref.=Somewhat       |             | -0.435       |             |             |             |             |             |             |             |             |             |             |
| Pref.=Very           |             | -0.360       |             |             |             |             |             |             |             |             |             |             |
| Int. xSomewhat       | 0.914        |             | -0.512      |             |             |             |             |             |             |             |             |             |
| Int. xVery           | 0.479        |             | -0.466      |             |             |             |             |             |             |             |             |             |
| Clean                | 0.669***     | 0.858***     | 0.774***    | 0.547       |             |             |             |             |             |             |             |             |
| Pref.=Somewhat       | 0.0783       |             |             |             |             |             |             |             |             |             |             |             |
| Pref.=Very           | 0.401        |             |             |             |             |             |             |             |             |             |             |             |
| Int. xSomewhat       | -0.357       |             |             |             |             |             |             |             |             |             |             |             |
| Int. xVery           | -0.961*      |             |             |             |             |             |             |             |             |             |             |             |
| Tiring               | -0.358**     | -0.389       | -0.284      | -0.0117     |             |             | -0.00942    | -0.180      | 0.0732      | -0.247      |             |             |
| Pref.=Somewhat       |             | -0.711       |             |             |             |             |             |             |             |             |             |             |
| Pref.=Very           | -1.161*      |             |             |             |             |             |             |             |             |             |             |             |
| Int. xSomewhat       | -0.0663      |             |             |             |             |             |             |             |             |             |             |             |

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|                     | Pref. = Somewhat | Pref. = Very | Int. x Somewhat | Int. x Very |
|---------------------|------------------|--------------|----------------|-------------|
| **Security**        | 0.95***          | 0.345        | 0.669***       | 0.863       |
| Pref. = Somewhat    | -0.0430         | -1.560***    |                |             |
| Pref. = Very        | -0.640          | -1.598***    | -0.340         |             |
| Int. x Somewhat     | 0.0299          | 0.344        | -0.343         |             |
| Int. x Very         | 0.695***        | 0.344        | -0.330         |             |
| **Freedom**         | -0.0937         | -0.395       | 0.00561        | 0.501       |
| Pref. = Somewhat    | -0.366          | -0.345       | 0.0392         | 0.000426    |
| Pref. = Very        | 0.426***        | 0.344        | 0.0392         | 0.299*      |
| Int. x Somewhat     | -0.0430         | -1.560***    | -0.340         |             |
| Int. x Very         | 0.695***        | 0.344        | -0.330         |             |
| **Time Pressure**   | -0.219          | -0.323       | 0.176          | -0.358      |
| Pref. = Somewhat    | 0.00275         | 0.238        | 0.252*         | -0.605**    |
| Pref. = Very        | 0.0498          | 0.653        | 0.153          | -0.0390     |
| Int. x Somewhat     | 0.370           | 0.767        |                |             |
| Int. x Very         | -0.0494         | 0.556        | 0.101          |             |
| **Ahead**           | 0.165           | 0.112        | 0.564***       | -0.254      |
| Pref. = Somewhat    | 1.013           | 0.00341      | -0.000341      | 0.514***    |
| Pref. = Very        | 0.979           | 0.416        | 0.0592         | 0.368***    |
| Int. x Somewhat     | -0.126          | 1.111        | 0.357          |             |
| Int. x Very         | 0.147           | 0.538        | -0.0913        |             |
| **Use Abils.**      | -0.643*         | -0.00733     | -0.228         | -1.653      |
| Pref. = Somewhat    | -3.483          | 1.924        | 0.620          | -0.00733    |
| Pref. = Very        | -3.184          | 2.573        | 1.113          | 0.00733     |
| Int. x Somewhat     | 0.101           | 0.830        | 2.572*         |             |
| Int. x Very         | -0.733          | 1.594        | 2.027          |             |
| **Hours**           | 0.376*          | 0.484        | 0.566          | 0.320       |
| Pref. = Somewhat    | -0.0112         | -0.638       | 0.466          | -0.0112     |
| Pref. = Very        | 0.387           | 0.0338       | 0.351          |             |
| Int. x Somewhat     | -0.120          | -0.496       | 0.0922         | -0.120      |
| Int. x Very         | -0.0962         | 0.0200       | 0.1087***      |             |
| **Constant**        | 48.20***        | 48.46***     | 50.72***       | 47.15***    |

NOTE: *: p<.05; **: p<.01. Results in models [A] and [B] use only cases with full information in the model [C] specification.
SOURCE: Wisconsin Longitudinal Study of 1957
Table 4: Joint Significance Tests for Physical Health Outcomes, by Gender

|                  | Non-FE | FE                  |
|------------------|--------|---------------------|
|                  | + Characteristics | +Preferences & Interactions | + Characteristics | +Preferences & Interactions |
|                  | F       | p                   | F               | p                   | F       | p                   | F               | p                   |
| 1992 Models      |         |                     |                 |                     |         |                     |                 |                     |
| BMI              | M       | 1.866               | 0.034           | 1.088               | 0.314   | 1.357               | 0.179           | 0.948               | 0.575           |
|                  | F       | 1.775               | 0.047           | 1.011               | 0.453   | 0.812               | 0.639           | 0.926               | 0.619           |
| SRH              | M       | 6.562               | 0.000           | 0.928               | 0.614   | 5.662               | 0.000           | 0.924               | 0.623           |
|                  | F       | 3.736               | 0.000           | 0.926               | 0.618   | 3.158               | 0.000           | 0.779               | 0.864           |
| Hospital Days    | NBRM    | 2.657               | 0.002           | 0.757               | 0.892   | 1.302               | 0.209           | 0.384               | 1.000           |
|                  | M       | 1.78                | 0.046           | 0.853               | 0.755   | 1.494               | 0.118           | 0.359               | 1.000           |
| Bed Days         | NBRM    | 5.225               | 0.000           | 0.821               | 0.807   | 1.219               | 0.263           | 0.497               | 0.999           |
|                  | M       | 5.056               | 0.000           | 0.884               | 0.700   | 2.745               | 0.001           | 0.497               | 0.999           |
| Illnesses        | NBRM    | 3.308               | 0.000           | 0.811               | 0.822   | 2.800               | 0.001           | 0.756               | 0.892           |
|                  | F       | 2.835               | 0.001           | 1.324               | 0.066   | 1.661               | 0.068           | 1.223               | 0.138           |
| Health Index     | ln OLS  | 3.027               | 0.000           | 0.728               | 0.919   | 2.572               | 0.002           | 0.677               | 0.957           |
|                  | M       | 3.740               | 0.000           | 0.950               | 0.573   | 3.123               | 0.000           | 0.865               | 0.732           |
| Health Limitations | ln OLS | 6.041               | 0.000           | 0.825               | 0.800   | 5.383               | 0.000           | 0.856               | 0.749           |
|                  | F       | 5.597               | 0.000           | 0.731               | 0.917   | 4.194               | 0.000           | 0.711               | 0.933           |
| 2004 Models      |         |                     |                 |                     |         |                     |                 |                     |
| BMI              | OLS     | 2.548               | 0.002           | 1.374               | 0.045   | 2.326               | 0.006           | 1.304               | 0.079           |
|                  | M       | 1.223               | 0.260           | 0.793               | 0.846   | 0.891               | 0.555           | 0.726               | 0.920           |
| PCSU             | OLS     | 5.532               | 0.000           | 0.682               | 0.954   | 3.913               | 0.000           | 0.707               | 0.937           |
|                  | F       | 3.546               | 0.000           | 0.930               | 0.612   | 3.418               | 0.000           | 0.902               | 0.665           |
| SRH              | OLS     | 7.678               | 0.000           | 0.899               | 0.671   | 7.430               | 0.000           | 0.897               | 0.675           |
|                  | F       | 6.026               | 0.000           | 0.899               | 0.671   | 3.559               | 0.000           | 0.931               | 0.608           |
| Bed Days         | NBRM    | 1.459               | 0.132           | 0.727               | 0.920   | 1.069               | 0.383           | 0.787               | 0.853           |
|                  | M       | 2.366               | 0.005           | 0.798               | 0.840   | 0.999               | 0.446           | 0.529               | 0.997           |
| Illnesses        | NBRM    | 0.546               | 0.886           | 0.898               | 0.673   | 0.905               | 0.541           | 0.764               | 0.883           |
|                  | F       | 1.841               | 0.037           | 0.943               | 0.586   | 2.251               | 0.008           | 0.976               | 0.521           |
| Health Index     | ln OLS  | 3.553               | 0.000           | 1.033               | 0.411   | 3.654               | 0.000           | 0.98                | 0.512           |
|                  | M       | 3.095               | 0.000           | 0.922               | 0.626   | 3.105               | 0.000           | 0.93                | 0.611           |
| Functional Limitations | ln OLS | 2.709               | 0.001           | 0.656               | 0.968   | 2.029               | 0.019           | 0.646               | 0.972           |
|                  | F       | 0.930               | 0.516           | 1.103               | 0.292   | 0.917               | 0.529           | 1.202               | 0.163           |
| 2011 Models      |         |                     |                 |                     |         |                     |                 |                     |
| BMI              | OLS     | 1.417               | 0.150           | 1.087               | 0.317   | 1.397               | 0.160           | 0.979               | 0.514           |
|                  | M       | 0.638               | 0.811           | 0.807               | 0.825   | 0.511               | 0.909           | 0.747               | 0.900           |

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| Description          | Method | Gender | F-statistic | p-value | F-statistic | p-value | F-statistic | p-value |
|----------------------|--------|--------|-------------|---------|-------------|---------|-------------|---------|
| PCSU                 | OLS    | M      | 4.846       | 0.000   | 0.824       | 0.801   | 3.255       | 0.000   |
|                      |        | F      | 2.703       | 0.001   | 0.832       | 0.788   | 2.166       | 0.011   |
| SRH                  | OLS    | M      | 5.673       | 0.000   | 0.748       | 0.899   | 3.736       | 0.000   |
|                      |        | F      | 1.995       | 0.021   | 0.580       | 0.991   | 1.258       | 0.237   |
| Bed Days             | NBRM   | M      | 2.661       | 0.000   | 0.462       | 0.999   | 0.641       | 0.808   |
|                      |        | F      | 1.142       | 0.320   | 1.024       | 0.427   | 0.788       | 0.664   |
| Illnesses            | NBRM   | M      | 0.933       | 0.513   | 0.810       | 0.823   | 0.783       | 0.669   |
|                      |        | F      | 2.632       | 0.002   | 0.901       | 0.668   | 2.276       | 0.007   |
| Health Index         | ln OLS | M      | 3.460       | 0.000   | 0.724       | 0.923   | 2.833       | 0.001   |
|                      |        | F      | 2.725       | 0.001   | 0.883       | 0.701   | 2.865       | 0.001   |

NOTE: ‘F’ indicates F-statistics for joint significance of the indicated independent variables (job characteristics for “+Characteristics”; job preferences and preference-characteristic interactions for “+Preferences & Interactions”). ‘p’ indicates the p-value associated with this F-statistic.

SOURCE: Wisconsin Longitudinal Study of 1957
Table 5: Joint Significance Tests for Mental Health Outcomes, by Gender

| Reg. Mod. | Characteristics | Preferences & Interactions | Non-FE | FE |
|-----------|-----------------|----------------------------|--------|----|
| 1992 Models |                 |                            |        |    |
| CES-D     | OLS M           |                            | 9.278  | 0.000 | 1.582 | 0.007 |
|           | F              |                            | 10.025 | 0.000 | 0.912 | 0.645 |
| Hostility | OLS F           |                            | 5.023  | 0.000 | 1.083 | 0.323 |
|           | F              |                            | 3.886  | 0.000 | 0.638 | 0.975 |
| Depress. Episodes | ln OLS M      |                            | 0.507  | 0.912 | 0.805 | 0.830 |
|           | F              |                            | 1.62   | 0.079 | 1.066 | 0.352 |
| Depress. Symptoms | ln OLS F     |                            | 2.374  | 0.005 | 0.782 | 0.860 |
|           |                 |                            | 1.127  | 0.332 | 1.026 | 0.424 |
| 2004 Models |                 |                            |        |    |
| CES-D     | OLS M           |                            | 9.594  | 0.000 | 1.444 | 0.025 |
|           | F              |                            | 5.867  | 0.000 | 0.729 | 0.918 |
| Hostility | OLS M           |                            | 4.211  | 0.000 | 1.145 | 0.230 |
|           | F              |                            | 3.371  | 0.000 | 0.948 | 0.575 |
| MCSU      | OLS M           |                            | 4.268  | 0.000 | 1.257 | 0.111 |
|           | F              |                            | 3.037  | 0.000 | 0.775 | 0.869 |
| Depress. Episodes | ln OLS M     |                            | 0.507  | 0.912 | 0.805 | 0.830 |
|           | F              |                            | 1.62   | 0.079 | 1.066 | 0.352 |
| Depress. Symptoms | ln OLS M |                            | 1.692  | 0.062 | 0.74  | 0.908 |
|           | F              |                            | 1.421  | 0.149 | 0.871 | 0.722 |
| 2011 Models |                 |                            |        |    |
| CES-D     | OLS M           |                            | 6.836  | 0.000 | 1.320 | 0.070 |
|           | F              |                            | 4.568  | 0.000 | 1.053 | 0.375 |
| Hostility | OLS M           |                            | 2.769  | 0.001 | 1.776 | 0.001 |
|           | F              |                            | 1.379  | 0.168 | 0.942 | 0.587 |
| MCSU      | OLS M           |                            | 3.475  | 0.000 | 0.702 | 0.940 |

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| Depress. Symptoms ln OLS | F   | 1.811 | 0.041 | 0.671 | 0.960 | 1.598 | 0.085 | 0.655 | 0.968 |
|-------------------------|-----|-------|-------|-------|-------|-------|-------|-------|-------|
| M                       | 2.247 | 0.008 | 1.004 | 0.465 | 2.269 | 0.007 | 0.942 | 0.588 |
| F                       | 0.759 | 0.694 | 0.574 | 0.992 | 1.063 | 0.388 | 0.533 | 0.997 |

NOTE: ‘F’ indicates F-statistics for joint significance of the indicated independent variables (job characteristics for “+Characteristics”; job preferences and preference-characteristic interactions for “+Preferences & Interactions”). ‘p’ indicates the p-value associated with this F-statistic. Bolded figures indicate statistical significance.

SOURCE: Wisconsin Longitudinal Study of 1957
APPENDIX A: VARIABLE MEASUREMENT DETAILS AND MISSING DATA

Job Characteristics Matched to Job Preferences

First, we measure job security with a scale from 0 to 10 measuring respondents’ perceived likelihood that they will lose their job in the next two years; this variable is then reverse-coded so that higher values indicate higher security. Second, we measure pay by the respondents’ hourly wage (or wage equivalent if salaried). Third, we measure fringe benefits as an additive measure (ranging from 0 to 3) indicating how many of the following benefits their job offered: retirement, health care, and paid vacation days. Fourth, to measure the extent to which a job is interesting, we took the inverse of the percentage of time the respondent spends doing rote work at their job. This percentage was calculated by taking the number of hours a respondent reports doing the same thing over and over, divided by the number of hours the respondent reports working, then reverse-coding that figure so that higher values indicate less rote work. Fifth, we measure the cleanliness of a job by reverse-coding a question asking respondents how dirty they got on the job. Sixth, we measured how tiring a job was using variables indicating how often the respondent’s job required physical effort and how often the respondent’s job required intense concentration. We took the higher reported value of these two measures as our indicator.

Seventh, we measured the hours respondents spent working using a measure of the number of hours the respondent worked per week, top-coded at 50. Eighth, we measured others’ perceptions of the respondent’s job using the Nakao-Treas scale of occupational prestige. Ninth, we measure freedom with an indicator of how often the respondent is supervised at his or her job (which we reverse-code). Tenth, we measured the pressure the respondent was under with a question asking how often the respondent feels under time pressure at his or her job. Eleventh,
we measured the respondent’s chance to *get ahead* with a question asking whether a person in their job could learn skills to get ahead. Finally, we used the educational requirements of a job as a proxy for the respondent’s chances to *use abilities* in his or her job. To capture this, we used a measure of the percentage of people in the 1970 census who held a similar job (matched by occupational census codes) and had completed at least one year of college.

**Physical Health Variables (1992, 2004, 2011)**

We draw on a range of measures of physical health in 1992 (when the respondents were approximately age 53), 2004 (age 65), and 2011 (age 72). We measure respondents’ self-rated health in all three years on a 1-5 scale, with 1 indicating ‘very poor’ health and 5 indicating ‘excellent’ health. Respondents’ functional limitations (Functional Limits 2004) are measured as the total of a series of nine tasks respondents reported that they had physical difficulties accomplishing in 2011: moderate activities such as moving a table, climbing flights of stairs, lifting ten pounds, lifting 25 pounds, pushing and pulling large objects, standing for one hour, sitting for one hour, crouching and kneeling, and reaching over their head.

Number of days spent sick in bed (Bed Days) in each year is measured using self-reported responses to the question, “During the last year, how many days, if any, did you stay in bed for more than half of the day because of illness or injury?” Similarly, the number of days respondents spent in the hospital in the last year (Hospital Days) is measured in 1992 using self-reported responses to the question, “During the last year, how many times, if any, have you been hospitalized for at least one night?”

Body Mass Index (BMI) is calculated in all three years by WLS staff using standard formulas and bottom and top codes of 18 and 43 respectively. The number of health problems
from a list that the respondent experienced in each year (Health Index) is measured as the sum of the health problems the respondent indicated that they had experienced in the last six months: lack of energy, trouble sleeping, fatigue/exhaustion, headaches, visual problems, dizziness/faintness, numbness, ringing ears, nausea, vomiting, upset stomach, constipation, diarrhea, urination problems, aching muscles, stiff/swollen joints, back pain, chest pain, shortness of breath, excess sweating, respiratory problems, and/or skin problems. The number of illnesses from a list that respondents reported had been diagnosed by a medical professional in each year (Illnesses) were summed into an index including: anemia, asthma, arthritis/rheumatism, bronchitis/emphysema, cancer, chronic liver trouble, diabetes, serious back trouble, heart trouble, high blood pressure, circulation problems, kidney/bladder problems, ulcer, allergies, multiple sclerosis, colitis, and other. An omnibus measure of physical health is measured using the Physical Composite Scores of the SF-12 survey battery (PCSU) in 2004 and 2011. We also used a separate measure of health limitations (Health Limitations 1992), using respondents’ dichotomous responses to the question, “Do you have a physical or mental condition that limits the amount or kind of work you can do for pay?”

**Mental Health Variables (1992, 2004, 2011)**

We also employ a number of measures of mental health status available in the WLS. Respondents’ number of lifetime depressive episodes in 1992 and 2004 (Depressive Episodes) was measured using their response to the question, “How many periods have you had in your lifetime that lasted two weeks or more when you felt sad, blue or depressed?” We also measured depression using the CES-D scale in all three years, and using the number of depressive symptoms the respondent reported experiencing for two weeks or more in their most recent
depressive episode in each year (Depressive Symptoms) out of the following: losing weight without trying to, having trouble falling asleep, feeling tired all the time, feeling very bad when waking up (but better later), losing interest in most things, having more trouble than normal concentrating, and thinking a lot about death. An index of hostility is also measured in each year (Hostility). Finally, an omnibus measure of mental health is captured using the Mental Composite Scores of the SF-12 survey (MCSU), implemented in the WLS survey in 2004 and 2011.

Missing Data

Large longitudinal surveys following respondents across multiple decades inevitably include missing variable responses, and the WLS is no exception. About 13% of 1975 weights, 4-39% of job characteristics, and 14-17% of health outcomes were missing among those who participated in each wave, were members of the labor force in 1992, and had not died.\(^1\) To address these missing data, we imputed 50 copies of the dataset using Stata/MP 14.0 and the –mi impute chained– command. We restricted imputation for each wave of labor force outcome variables to those who were alive and participated in that year of the survey. Data were imputed separately by both gender and wave – respectively, to account for the fundamentally different linkages between variables and to ensure that sufficient complete information was available for the imputation. Model independent variables are included in all imputations regardless of the year collected. Continuous and ordinal variables were imputed via linear regression, and dichotomous variables were imputed via logistic regression. Imputed values for ordinal variables were rounded to the nearest integer, and imputed values outside the observed range of the variable were rounded to the nearest observed value for all variables.

\(^1\) These summary statistics exclude two outlier variables – 39% of employee ratings of freedom and 50% of functional limitation ratings in 2011 were missing as well.
### Table A1: 1992 Measures of Occupational Success Matched to Job Characteristics

| JOB CHARACTERISTIC LABEL | JOB PREFERENCE WORDING                                      | JOB AMENITIES MEASURE                                                                 | RESPONSE CATEGORIES                                                                                      |
|--------------------------|--------------------------------------------------------------|----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| Security                 | “Job security”                                               | Likelihood respondent will lose job in next 2 years (reverse-coded)                     | Scale from 0 to 10                                                                                      |
| Pay                      | “The pay”                                                    | Hourly wage                                                                           | $0 to $200 per hour                                                                                   |
| Prestige                 | “How highly people regard the job”                          | Nakao-Treas (1994) prestige scale                                                     | 126 to 996                                                                                              |
| Benefits                 | “The fringe benefits”                                        | Retirement, health and vacation days                                                   | 0 to 3 (additive scale)                                                                                 |
| Interesting              | “How interesting the work is”                                | Percentage of time respondent spends doing same thing over and over (reverse-coded)     | 0 to 100%                                                                                               |
| Clean                    | “How clean the work is”                                     | How dirty respondent gets in job                                                       | 1 = Very dirty 2 = Fairly dirty 3 = A little dirty 4 = Not at all dirty                                  |
| Tiring                   | “How tiring the work is”                                    | Maximum(How often job requires physical effort; How often job requires intense concentration) | 1 = Always 2 = Frequently 3 = Sometimes 4 = Rarely 5 = Never                                        |
| Hours                    | “The hours you work”                                         | Hours worked per week                                                                  | 1 to 96                                                                                                 |
| Freedom                  | “The amount of freedom you have”                             | How often respondent supervised                                                        | 0 = several times per hour 1 = once per hour 2 = several times per day 3 = once per day 4 = several times per week 5 = once per week 6 = several times per month 7 = once per month 8 = several times per year 9 = once per year 10 = Never |
| Pressure                 | “Not being under too much pressure”                          | How frequently respondent is under time pressure (reverse-coded)                       | 1 = Always 2 = Frequently 3 = Sometimes 4 = Rarely 5 = Never                                          |
| Ahead                    | “The chance to get ahead”                                    | Person in job could learn skills to help get themselves ahead                         | 1 = Disagree strongly 2 = disagree moderately                                                        |
| Abilities | “The chance to use your abilities” | Standardized score: \( \ln(\frac{X + 1}{100 - X + 1}) \) Where X = the percentage of people in the 1970 census employed in the same occupation/industry/class of worker category as the respondent, who completed at least one year of college. | 3 = disagree slightly  
4 = neither agree nor disagree  
5 = agree slightly  
6 = agree moderately  
7 = agree strongly | -4.6 to 4.6 |