

# The Changing (Dis-)Utility of Work

Greg Kaplan and Sam Schulhofer-Wohl

**M**ost economists view monetary rewards as by far the most important aspect of jobs and careers. The disutility of supplying one hour of labor is assumed to be the same whether that hour is spent building cars on an assembly line, waiting tables at a restaurant, teaching a class, or pitching for the Chicago White Sox. In consequence, in conventional models, the tradeoffs workers make between consumption and leisure can be assessed solely by looking at hours worked and wages.

Yet it is obvious to many workers that a job involves more than just forfeiting some leisure time in return for a wage (Schwartz 2015). Jobs differ in the physical and mental toll they take on workers, as well as in the psychological rewards they provide, such as autonomy and meaning (Kalleberg 2011).

Our study asks how the major occupational shifts in the postwar period have manifested in changes in the nonpecuniary costs and benefits of work. Many fewer people work on assembly lines now than in 1950, while many more work in services and sales. Women and minorities have moved in large numbers into jobs where they once faced substantial barriers to entry. How have these shifts changed the aggregate amount of hardship or disutility that people experience from their work, the aggregate psychological rewards or utility that they derive from it, and the distribution of disutility and utility across the population?

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Drawing on data from the American Time Use Survey (ATUS), we examine six dimensions of workers' feelings about the time they spend on the job in different occupations: how happy, sad, and tired they are; how much stress and pain they experience; and how meaningful they find their work. We then calculate how economy-wide *average* feelings about work depend on the mix of occupations in the economy.

For some of the dimensions we study, such as pain, introspection offers an easy answer to the direction of change for most workers in developed countries. Although even today many jobs are undoubtedly physically demanding, we can easily compare how someone feels after a day of office work with how a farmer in the early 20th century must have felt after a day in the fields. Our results confirm that, in the aggregate, work has become less painful and less tiring in the postwar period.

But for other dimensions, where introspection does not provide easy answers, our study offers tentative new insights on the directions of change for US workers. We find substantial heterogeneity in how the nonphysical costs and benefits of work have changed over time. For women, the nonphysical aspects of work have on average become more positive over time: Women have shifted toward occupations that produce more happiness and meaningfulness and less sadness, while experiencing no change in stress. The story for men is more negative. Although they have shared in the reduction in pain and tiredness, they also have shifted toward occupations that produce more stress, less happiness, and less meaningfulness. The improvements for women and the reduction in meaningfulness for men appear to be concentrated among people at lower education levels. All this is not to deny, of course, that many workers even today have jobs that are painful, tiring, meaningless, saddening, or stressful—only that the share of such jobs is lower than in the past.

Our analysis of the nonpecuniary implications of changes in the occupational structure complements the large existing literatures on the wage and employment implications of these changes. For example, Herrendorf, Rogerson, and Valentinyi (2014) examine the aggregate employment and consumption effects of sectoral shifts from agriculture to manufacturing and then to services over the last two centuries. More recent changes in the occupational structure have been characterized by polarization—meaning the simultaneous growth of high-wage, high-skill jobs and low-wage, low-skill jobs, even as employment shrinks in the middle of the wage and skill distribution (Autor, Katz, and Kearney 2006). Studies of polarization have highlighted how these different patterns of job growth relate to the changing nature of tasks required by employers and the skills required to do different tasks (Acemoglu and Autor 2011). Although these analyses usually focus on the monetary returns to different types of skills, it is increasingly accepted that the nonmonetary returns to skill have also changed and that these changes differ sharply in the cross-section (Hamermesh 2001).

There is extensive debate over the macroeconomic forces that have led to polarization, but much less work on the consequences of polarization for workers' well-being, both individually and in the aggregate. With the recent rise in long-term unemployment in the United States and the rise in deaths related to substance abuse and suicide in the same time period (Case and Deaton 2017), it is becoming

more evident that the loss of psychological benefits of work may be an important component of the overall costs of changes in employment.

One potential psychological benefit of work is its meaning (if any). The opening sentences of Ariely, Kamenica, and Prelec (2008) summarize the gap between the importance that workers place on meaning and the importance that economists place on it:

Most children think of their potential future occupations in terms of what they will *be* (firemen, doctors, etc.), not merely what they will *do* for a living. Many adults also think of their job as an integral part of their identity. At least in the United States, “What do you do?” has become as common a component of an introduction as the anachronistic “How do you do?” once was, yet identity, pride, and meaning are all left out from standard models of labor supply.

That paper demonstrates the importance of meaning for workers’ productivity in a laboratory setting. But there are also many examples of the strength of meaning as a motivating tool in real workplaces (Grant 2007, 2012). Against the backdrop of these micro-level examinations of the role of meaning in particular work environments, our study offers a macro perspective on the aggregate meaningfulness of work across the US economy.

On the cost side, economists typically think only of the opportunity cost of the time spent at work. But there are many features that make some jobs less desirable than others (Katz and Krueger 2016). For example, work can be so physically demanding that it leaves workers tired, injured or ill, or even kills them. Work has become dramatically less deadly over time (Aldrich 1997; Centers for Disease Control and Prevention 1999), perhaps as a result of occupational safety regulations (Levine, Toffel, and Johnson 2012). Yet even if a job does not directly damage a worker’s body, it can take a mental toll, as in Frey’s (1996) description of an air traffic controller who lost radio contact with the airplanes he was guiding:

Watching in helpless horror as his planes careered farther and farther off course, the controller rose from his chair with an animal scream, burst into a sweat and began tearing off his shirt. By the time radio contact was re-established—and the errant planes were reined in—the controller was quivering on the floor half naked, and was discharged on a medical leave until he could regain his wits.

The costs of such workplace stress are potentially significant: The famous Whitehall studies (Marmot, Shipley, Hamilton 1978; Marmot et al. 1991) found an inverse relationship between employment rank in the British civil service and health outcomes, a pattern that has been interpreted as indicating that stress and other negative psychological features of low-ranking jobs may harm health, given that most of the study subjects at all ranks were office workers who had equal access to the National Health Service (Smith 1999).

Another nonpecuniary cost of many jobs that has attracted recent attention is inflexibility. Jobs in the so-called “gig economy” may provide more flexibility—for example, Uber drivers can decide exactly when they want to work, instead of taking shifts assigned by a manager (Hall and Krueger 2018), though potentially at the cost of reducing workers’ wages or their ability to work full time when they wish to do so (Katz and Krueger 2016). Some recent studies have tried to quantify the value of flexibility by eliciting willingness to pay for increased autonomy in hours of work (Mas and Pallais 2017).

The main challenge we face in studying the aggregate changes in the nonpecuniary costs and benefits of work is that the survey data on workers’ feelings are available only in 2010, 2012, and 2013. Thus, we must impute how workers felt about their jobs in past years based on recent information. Our strategy begins by measuring changes in the distribution of occupations. We then use the American Time Use Survey data to assign each occupation a vector of scores based on the feelings that its workers report in the recent data. Finally, we ask: If the distribution of occupations were different from what we see today, but feelings about each of the occupations stayed the same, how would workers’ total experiences change? How much more or less stress, for example, would the workforce collectively experience if the distribution of occupations was the one observed in 1950, rather than the distribution observed today? How much more or less meaning, happiness, tiredness, and pain?

Our focus throughout is on market work. In the conclusion, we discuss how our approach might also be used to assess the consequences of women’s significant increase in labor force participation in the postwar period, which would require a measure of feelings about nonmarket work.

Our approach relies on three key assumptions. First, we assume that the feelings an occupation produces today are the same as those it produced in the past. Second, although economists since Adam Smith (1776) have appreciated that pay may vary inversely with the nonpecuniary qualities of a job, we assume that any such compensating differentials do not affect the feelings that workers report. Third, we assume that the feelings a particular worker reports on the job are caused by that worker’s occupation and not by his or her other circumstances or personality. At the end of the paper, we describe the implications of these assumptions for our findings as well as some robustness checks. The paper concludes by discussing some potential extensions and broader implications of our work, in particular how findings about the nonpecuniary characteristics of work should influence the analysis of big-picture labor market outcomes such as labor force participation and inequality.

## **Evolution of Occupations over Time**

The first step in our estimation strategy is to measure shifts in the distribution of occupations over time. This requires us to categorize occupations in a consistent way in data from 1950 to the present day.

We use data from decennial Censuses from 1950 through 2000 and the 2011–2015 American Community Survey (ACS) to measure the distribution of occupations by sex, race, and education. Our occupation categories use the OCC1990 occupation coding produced by IPUMS (Integrated Public Use Microdata Series), described at <https://usa.ipums.org/usa-action/variables/OCC1990>. OCC1990 is based on the occupation codes used in the 1990 Census; it maps occupation codes used in other years to the 1990 codes, and aggregates some categories to make the coding more consistent over time. The American Time Use Survey data include only the current occupation coding scheme, which we map to OCC1990 ourselves.

The OCC1990 coding contains 389 occupation categories. Some of these categories are so narrow that we observe very few workers in them in the American Time Use Survey—too few to be able to estimate feelings precisely for these occupations. In addition, even though OCC1990 is harmonized, it is not entirely uniform over time because of changes in the level of detail in the census occupation variables.<sup>1</sup> To improve the uniformity of the coding and to ensure a reasonably large number of people are used to calculate workers’ feelings in each occupation, we aggregate the occupations to 12 broad categories. (We exclude military occupations.) Of course, aggregating occupations in this way poses the risk that the occupations categorized as, say, “sales occupations” in 1950 are quite different from those categorized as sales occupations in recent years. However, in analyses not reported here, we have found that we obtain similar overall results if we use the detailed OCC1990 codes, but the changes in the share of workers in each occupation become difficult to interpret (for example, because of the reclassification of detailed categories between 1950 and 1990).

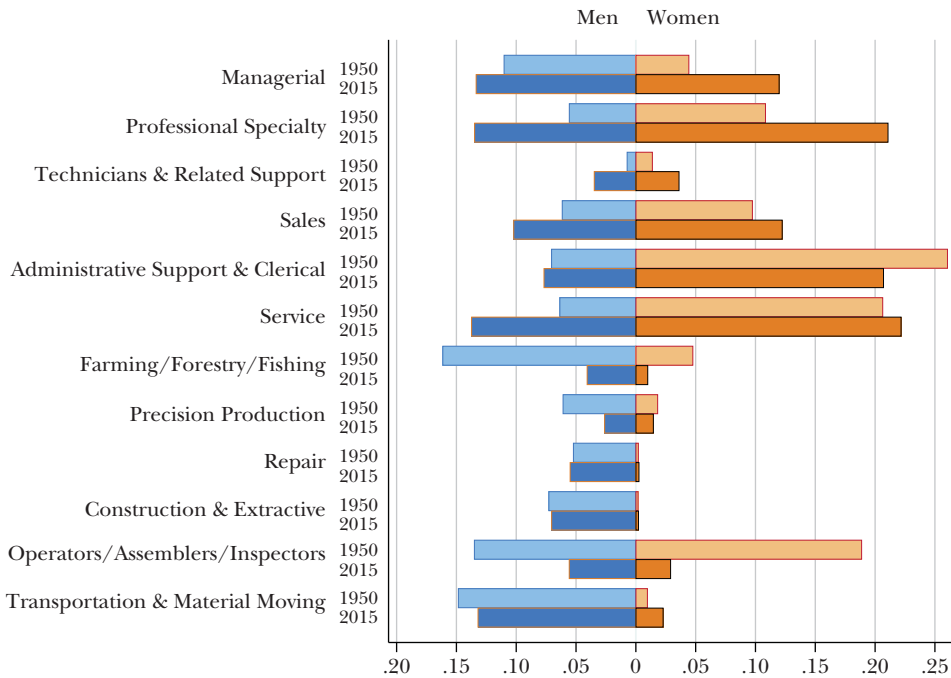
With this coding in hand, we estimate the distribution of occupations by race, sex, and education in the 1 percent sample of the 1950 Census, the 5 percent samples of the 1960, 1980, 1990, and 2000 Censuses; the 1 percent form 1 and form 2 state samples of the 1970 Census; and the 2011–2015 five-year ACS sample. We obtain all datasets from IPUMS (Ruggles, Genadek, Goeken, Grover, and Sobek 2015). We also consider three education groups: a high school diploma or less, some college, and a bachelor’s degree or more.

Figure 1 shows the categories and the distributions of men and women across occupations in 1950 and in 2015. Since 1950, both men and women have moved into managerial and professional specialty occupations, and out of farming and machine operating (the Operators/Assemblers/Inspectors category on the figure). Women have moved out of administrative support, but the share of men in that field has remained roughly constant. By contrast, men have shifted in large numbers into service occupations, while the share of women in service occupations is little

<sup>1</sup>For example, in the 1950 Census, almost all people in management jobs were recorded as “Managers, officials, and proprietors (not elsewhere classified),” which maps to the OCC1990 code “Managers and administrators, n.e.c.” (code 022). But by the 1990 Census, which forms the basis for the OCC1990 codes, some managers were recorded as working in specialties, such as “managers of food-serving and lodging establishments” (code 017). Thus, a restaurant manager would be assigned the OCC1990 code 022 in the 1950 Census but code 017 in the 1990 Census or the 2011–2015 American Community Survey (ACS).

Figure 1

**The Distribution of Workers across Broad Occupation Groupings in 1950 and 2015**



Source: Authors' calculations from 1950 Census and 2011–2015 American Community Survey.

Note: The figure shows the proportion of men and women in each occupational grouping in 1950 and 2015.

changed. Some occupations, such as construction, have stable shares of the population over time.

These shifts create the potential for heterogeneity by sex in how feelings about work has changed, for two reasons. First, men and women have moved into and out of different occupations, so even if men and women don't differ from each other in their feelings about each occupation, the aggregate changes they have experienced will differ. Second, men and women may feel differently about the same occupations, so even where they have experienced similar changes in occupation shares, as with the shift into professional specialty occupations, the impact on the utility or disutility of work may differ. Our methodology will allow for both of these possible sources of change.

**Feelings about Work**

The American Time Use Survey, produced by the US Census Bureau, is a stratified random sample of the US population ages 16 and older. (Specifically, respondents to the survey are a subset of respondents to the Current Population

Survey.) The survey asks respondents to report, in significant detail, how they spent each minute of a day. Respondents also report their occupation in their main job (but not in any other jobs they may have).

In 2010, 2012, and 2013, the American Time Use Survey contained a “well-being module” that randomly selected three activities during the day for each respondent and asked the respondents to report their feelings while engaged in these activities. Activities were eligible to be randomly selected for these questions if they lasted at least five minutes and did not fall into the categories of sleeping, grooming, personal activities, refusal, or don’t know. For the chosen activities, respondents were asked about how they were feeling during these activities along six dimensions: how happy, how sad, how stressed, how tired, how much pain, and how meaningful. They were asked to rank each of their feelings on a scale from 0 (not at all) to 6 (very much).<sup>2</sup>

To produce an index of feelings by occupation, we run six ordinary least squares regressions. In each case, the dependent variable is one of the six measures of feelings about time spent at work. The explanatory variables are 12 categories of occupations described in the previous section, and dummy variables for age, race, and education level. We then compute the mean response to each question within each occupation category, adjusted for differences in demographics across occupations. In online Appendix A1, we provide a detailed description of our procedure, including a table of the adjusted mean feelings for men and women in each occupation.

In our main analysis, we use these data only for respondents who were asked to report their feelings during the activity of working on their main job, but in online Appendix A2 we report results from an analysis with individual fixed effects that also uses data on feelings during activities other than work.

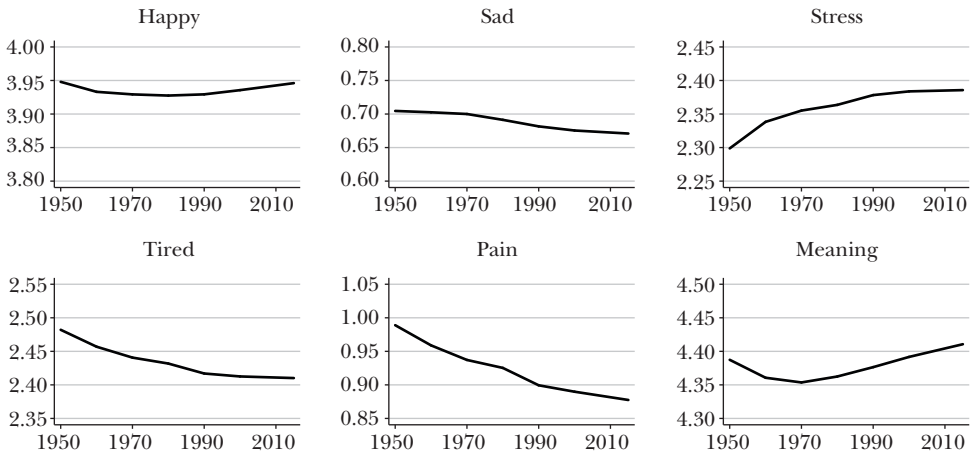
Our next step is to combine the (adjusted) estimates of feelings about work for each occupation with the census data on occupations described earlier. For each census year, we compute the average stress of work by taking a weighted average of the stress indexes of each occupation, weighting by the distribution of occupations in that year. We repeat this calculation for the five other feelings.<sup>3</sup>

Figure 2 shows how aggregate mean feelings at work have evolved over time for the six types of feelings in the data. Relative to 1950, the current distribution

<sup>2</sup>We obtain the American Time Use Survey (ATUS) microdata from the American Time Use Survey Data Extract Builder at <http://www.atusdata.org> (Hofferth, Flood, and Sobek 2015). We use the well-being module activity-level weights for estimation and normalize the weights such that the 2010, 2012, and 2013 samples receive equal weight in the calculations.

<sup>3</sup>In principle, to compute aggregate mean feelings in the present era, we could directly calculate means of self-reported feelings on the job in the American Time Use Survey (ATUS). However, because the ATUS is relatively small and not all respondents are asked to report their feelings at their main job, the distribution of occupations among ATUS respondents who report feelings on their main job could randomly differ by a significant amount from the population distribution of occupations. To rule out this problem, we estimate aggregate mean feelings in the present era with a weighted average of occupation-specific feelings, weighted by the occupation distribution in the 2011–2015 American Community Survey (ACS). See online Appendix A1 for details.

*Figure 2*  
**Changes in Aggregate Feelings at Work, 1950 to Present**



*Source:* Authors' calculations from Census, American Community Survey, and American Time Use Survey.  
*Note:* Lines show average of occupation scores weighted by distribution of occupations in each year. Occupation scores and occupation distributions are calculated for the full population; occupation scores are adjusted for age, race, sex, and years of education.

of occupations makes workers less sad and less tired, and makes them experience less pain. However, work also produces more stress. Happiness and meaningfulness both fell in early years, then rose in later years.<sup>4</sup>

## Feelings about Work by Gender, Education Level, and Race

The results change substantially when we calculate aggregate mean feelings separately by sex. To do this, we follow the same approach but compute both the adjusted mean feelings within each occupation category, and the yearly distribution of occupations, separately by demographic group (sex, sex  $\times$  education, and sex  $\times$  race  $\times$  education). Online Appendix A1 provides details.

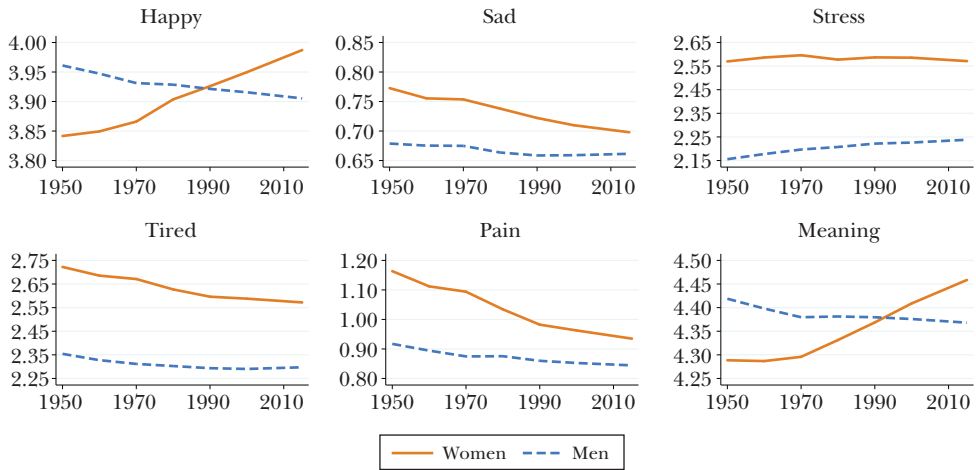
For women, the story is one of consistently improving feelings about work. Over time, as Figure 3 shows, work produced more happiness and a greater sense of meaning, and less sadness, tiredness, and pain; stress levels stayed roughly constant. Thus, over the period we examine, not only were women moving into the work

<sup>4</sup>It should be noted that estimation uncertainty in this calculation arises both from uncertainty in the estimation of the occupation shares and uncertainty in the estimation of the occupation-adjusted mean feelings. But in practice the census data are large enough that the occupation shares are estimated quite precisely, and uncertainty in the estimates of mean feelings by occupation in the American Time Use Survey data is the main source of uncertainty in our results.



Figure 3

Changes in Aggregate Feelings at Work by Sex, 1950 to present



Source: Authors' calculations from the Census, American Community Survey, and American Time Use Survey.

Note: Lines show average of occupation scores weighted by distribution of occupations in each year. Occupation scores and occupation distributions are calculated separately by sex; occupation scores are adjusted for age, race, and years of education.

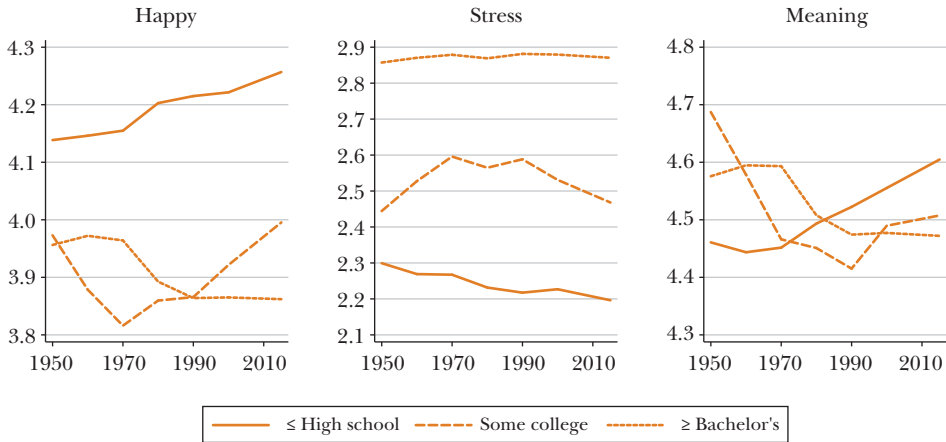
force but they also were shifting to occupations with better nonpecuniary attributes. By contrast, for men, the picture is more mixed: Although work became less painful and tiring, it also became more stressful, less meaningful, and less happy.

These patterns may be partly the result of aggregating together very different occupations, such as including both restaurant managers and chief executive officers in the managerial category. We can attempt to classify occupations more finely, despite the lack of perfectly uniform coding across years, if we divide the sample by education. When we do this, we re-estimate the adjusted mean feelings within each occupation, using only data on workers at a given education level (as explained in online Appendix A1).

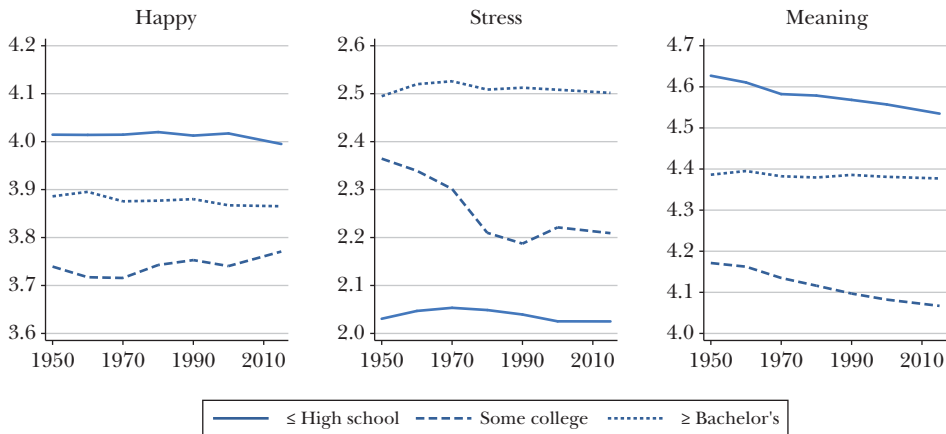
Figure 4 shows how happiness, stress, and meaningfulness have evolved when we divide the sample by both education and sex. We concentrate on happiness, stress, and meaning because there appears to be little interesting heterogeneity in tiredness and pain, and sadness appears to be the inverse of happiness. For women, shown in the top panel of the figure, the gains in happiness and meaningfulness are concentrated among those with no more than a high school diploma. The highest-educated women actually show falling happiness and meaningfulness, similar to the overall findings for men. For men, shown in the bottom panel, there is a clear drop in meaningfulness at lower education levels. However, we find no rise in stress and little decrease in happiness for men within education groups, suggesting that the trends in these variables for men overall might result from men at different

Figure 4  
**Changes in Aggregate Feelings at Work by Sex and Education**

A: Women



B: Men



Source: Authors' calculations from the Census, American Community Survey, and American Time Use Survey.

Note: Lines show average of occupation scores weighted by distribution of occupations in each year. Occupation scores and occupation distributions are calculated separately by sex and education; occupation scores are adjusted for age, race, and years of education.

education levels having different feelings about the same occupation, which is not detected when we look at men overall.

These conclusions should be regarded as tentative. One reason is that disaggregating by education means that we are using a smaller sample to estimate each occupation score. Another reason is that disaggregating by education could under some circumstances exacerbate rather than reduce any bias in our estimates of feelings by occupation—rising education levels within occupations (for example, see

Spitz-Oener 2006) mean that the type of managerial work done by someone with a high school diploma today may be quite different from that done by someone with a high school diploma in 1950.

We can also disaggregate the results by race. We examine only whites and blacks because the sample size of the American Time Use Survey contains too few respondents of other races to obtain precise estimates when we disaggregate by race, sex, and education. In Figure 5, we focus on estimates for people with a high school education or less. The trends in meaningfulness are the same across races—meaningfulness has risen for both white and black women, and fallen for both white and black men. However, happiness has risen for white women while falling for black women, and stress has risen for black men while falling for white men and women. Importantly, these estimates account only for differences in feelings about the occupation itself, not for differences in pay. If racial discrimination in pay varies across occupations or has changed over time, the change in workers' overall happiness could be quite different.

## Sources of the Shifts

What is driving these shifts in aggregate feelings about work? To gain some insight into this issue, we plot the relationship between an occupation's average feelings and the change in the share of workers in that occupation since 1950. Figure 6 shows these relationships for happiness, stress, and meaning, separately for women and men. Each circle in the graphs represents a different occupation category, with area proportional to the occupation's share of workers in 1950.

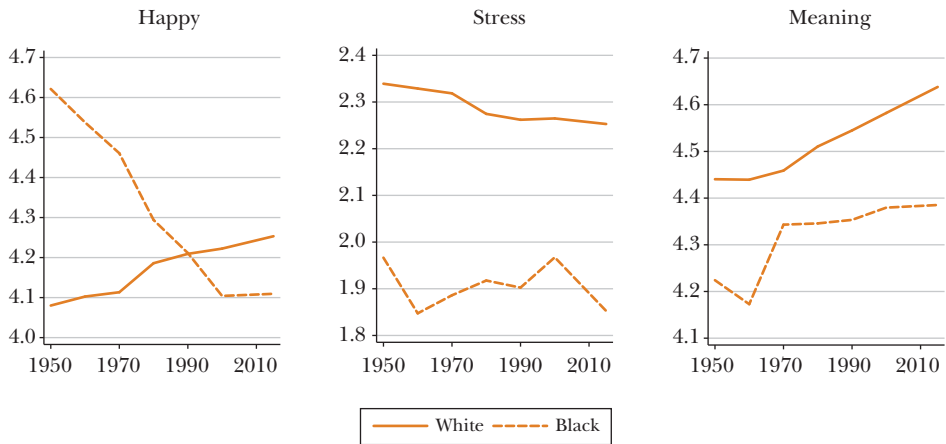
The figure shows that the different results for men and women arise not only from differences in how their occupation distributions have changed, but also from differences in the feelings they report in the same occupational categories. For example, both men and women are less likely now than in 1950 to work as machine operators, assemblers, and inspectors. For women, such jobs are associated with below-average happiness and meaningfulness, so the shift increases women's happiness and meaning at work. For men, such jobs are associated with *above*-average happiness and meaningfulness, as well as below-average stress, so the same shift in the occupation distribution *decreases* the nonpecuniary value of work for men.

These patterns suggest that the overall improvements for women appear to be driven by their shift into professional and managerial work and out of factory work, while the overall decreases for men appear to be driven by their shift out of farming and factory work and into professional and service occupations.

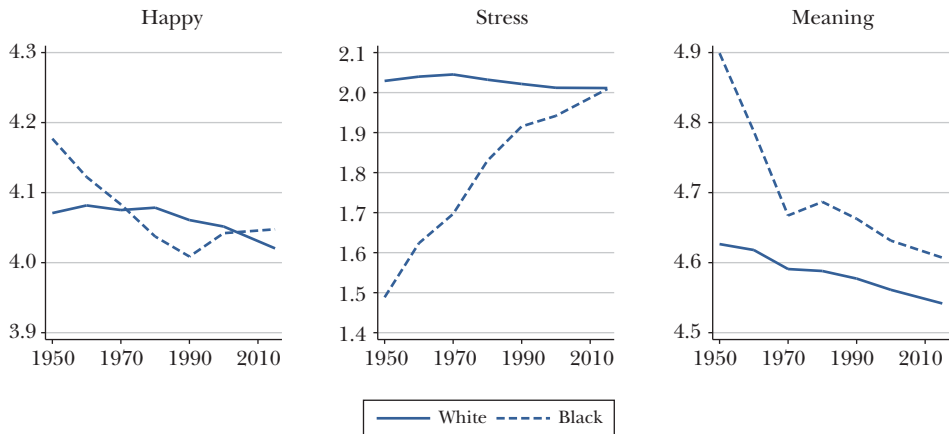
We emphasize that the gender differences in reported feelings for the same occupation can be interpreted in multiple ways. The differences could mean that men and women feel differently about exactly the same jobs. Alternatively, within a single occupation code, men and women might on average be doing slightly different jobs that our coding is not sufficiently detailed to reveal. Another possibility is that men and women feel the same about the actual tasks involved in the work but that the

*Figure 5*  
**Changes in Aggregate Feelings at Work by Sex and Race (Education ≤ High School), 1950 to the Present**

A: Women



B: Men



*Source:* Authors' calculations from the Census, American Community Survey, and American Time Use Survey.

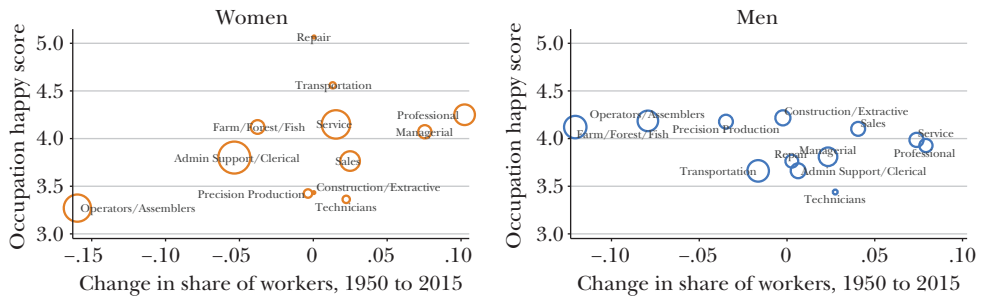
*Note:* Lines show average of occupation scores weighted by distribution of occupations in each year. Occupation scores and occupation distributions are calculated for black and white respondents with no more than a high school education, separately by race and sex; occupation scores are adjusted for age and years of education.

broader work environment has disparate impacts on men and women, such as when sexual harassment occurs. Finally, to the extent that feelings about work are socially constructed, the reported gender differences might reflect messages that society sends to men and women about how they “should” feel about different jobs, rather than any differences in how people would feel absent such messages.

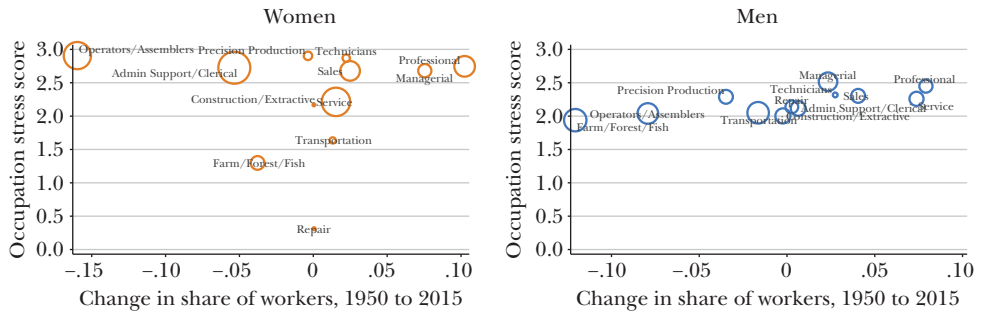
Figure 6

**Changes in Occupation Share and Average Feelings by Occupation**  
*(area of circles proportional to share of workers in occupation in 1950)*

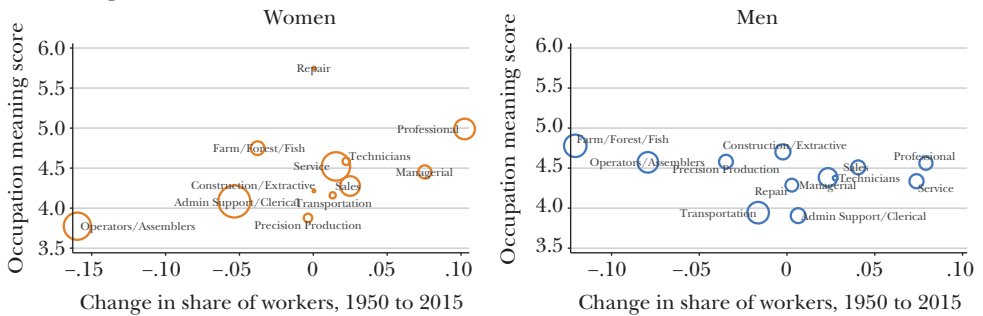
A: Happy



B: Stress



C: Meaning



Source: Author's calculations from the Census, American Community Survey, and American Time Use Survey.

Note: Occupational scores and occupational distributions calculated separately by sex; occupation scores adjusted for age, race, and education.

**Discussion of Assumptions**

We relied on several strong assumptions to measure workers' feelings about different occupations. Here, we discuss the potential biases that these assumptions

may create and some robustness checks that we have carried out to help evaluate their importance.

### **Have Feelings about Occupations Changed over Time?**

Our approach assumes that the feelings an occupation produced in the past are the same as those it produces today. Direct measures of workers' feelings about their job in past eras would be preferable if they were available, but we are not aware of any historical data on subjective feelings about work in particular occupations that we can measure in a consistent way over time.

This assumption may be particularly problematic when considering the physical costs of work. Regulations and technological improvements have made many jobs safer than in the past. In addition, in many occupations, capital equipment has substituted for human effort; a miner today is more likely to operate heavy machinery and less likely to wield a pickaxe.

To the extent that changes in occupations over time have merely dampened the differences between occupations but not erased or reordered them, our results will underestimate the effect of changes in the occupation distribution. For example, if working on an assembly line has always been more tiring than working as retail sales clerk, but the gap is smaller today than in the past, our approach will underestimate the difference in tiredness between manufacturing and retail jobs in 1950 and therefore underestimate the change in average feelings caused by the large-scale shift from the former occupation to the latter.

However, it is also possible that the relative rank of occupations has changed over time. For example, the "meaningfulness" of a particular occupation may in part be socially constructed and depend on the value that the worker's family, friends, neighbors, or society at large happen to place on that occupation. Workers in various occupations have sought to increase their prestige by defining them as professions (Larson 1977), and public opinion polls have also measured fluctuations in occupations' prestige over time (for example, Taylor 2001). Absent data on workers' feelings in the past, we cannot assess how such changes might have affected our results.

A related possibility is that the relationship between education and how workers feel about their jobs has varied across cohorts. For example, the education system might somehow encourage people who reach a certain schooling level to view a particular kind of occupation as especially appropriate or meaningful, but which occupations these are might change over time. In online Appendix A3, we investigate this possibility by controlling for an interaction of age and education when estimating the average feelings in each occupation. This change has little impact on our results.

In addition, it is possible that workers' preferences for particular attributes of work have changed over time, for example, perhaps because preferences have been altered as a result of rising incomes since 1950. Again, absent data on past feelings, we have no way to measure the direction or magnitude of changes in preferences, although one might extend our approach by seeking to estimate the relationship between income and cross-occupation differences in feelings.

### **What about Compensating Differentials?**

We do not attempt to measure differences in wages between occupations or how these differences might relate to the feelings that workers report. This focus means that, at most, our analysis provides an account of how the changing occupation distribution affects nonpecuniary costs and benefits of work, but cannot hope to describe the effect on workers' overall welfare.

Moreover, our calculation assumes that the feelings workers report in the American Time Use Survey depend only on the actual jobs they are doing and not on how much they are paid to do those jobs, because our method takes account of changes over time in the distribution of occupations but not of changes in the wage for each occupation. If, instead, the feelings that workers report in the survey also depend on their pay, the compensating differentials would likely lead us to underestimate the differences between occupations and underestimate the effect of changes in the occupation structure. For example, if workers who are less happy about their tasks are also more happy about their wages, then the reported difference in happiness between two occupations would be biased downward. This bias is likely of greatest concern for dimensions such as happiness and sadness that potentially reflect workers' overall views of a job, and is of less concern for dimensions that measure more specific feelings such as meaning or pain.

Related, our results treat each dimension of feelings about work as separate and do not attempt to map changes in the vector of feelings into changes in a single index of the amount of (dis-)utility that workers experience. One could compute such an index by estimating compensating differentials for the feelings that different occupations produce—via hedonic wage models of the type pioneered by Tinbergen (1956)—and then calculating the compensating variation associated with a change in the occupation distribution. However, estimating the compensating differentials is not straightforward, due to the way workers with heterogeneous preferences endogenously sort across occupations (Bartik 1987; Epple 1987). We leave such calculations for future research.

### **Might Feelings about Occupations Reflect other Individual Traits?**

Our approach assumes that the feelings a particular worker reports on the job are caused by that worker's occupation, rather than by other circumstances or personality. For example, when we observe that people in managerial occupations report an above-average level of stress, we assume that this is because management work is inherently stressful, and not because people who would feel stressed in any job are more likely to end up being managers. This assumption will fail if occupation choices are correlated with other factors that affect a person's feelings, and if it fails, our results will be biased.

One possible robustness check to address this issue, using the American Time Use Survey data, is to control for the feelings that workers report when they are not on the job. These feelings in nonwork activities might be viewed as an indicator of the permanent feelings that a person would report regardless of occupation, so controlling for them might adjust for all of the nonoccupation differences between

respondents. In online Appendix A2, we carry out this calculation, using a fixed-effects estimator to identify the effect of an occupation by measuring the difference between the feelings that a worker reports on the job and the feelings that the very same worker reports in other activities. We refer to our original measure of the feelings generated by an occupation as the occupation's baseline score, and to the measure that is adjusted for feelings reported during other activities as the occupation's fixed-effects score.

For most occupations whose shares changed substantially, and for most of the types of feelings that we measure, the fixed-effects and baseline occupation scores are closely correlated. This correlation gives some confidence that our basic approach to measuring the feelings induced by an occupation is reasonable.

However, there are a few outliers in the occupation scores, which can lead to different estimates of the aggregate trend in feelings. For example, among women, the fixed-effects score for machine operators, assemblers, and inspectors often differs substantially from the baseline score. This occupation was one of the lowest scoring on happiness for women in the baseline but one of the highest scoring on happiness for women in the fixed effects estimate. Also, this occupation shrunk substantially from 1950 to 2015. As a result, women in this occupation had a downward trend in happiness according to the fixed effects estimates, but an upward trend according to the baseline estimates. For men, farming, forestry, and fishing were rated very high in meaning in the baseline estimates but quite low in the fixed effects estimates, while service occupations received a moderate meaning score in the baseline and a high score with fixed effects. Thus, the shrinkage of the agricultural sector and the growth of service work implied decreasing meaningfulness for men according to the baseline estimates but rising meaningfulness according to the fixed effects estimates. The differences between the fixed effects and baseline estimates appear to be concentrated at lower education levels.

The differences between the fixed effects and baseline estimates suggest a need for caution in interpreting the overall results. However, the fixed-effects approach is imperfect in various ways and might have biases of its own. For example, if a good job also gives the worker more positive feelings when she is at home, the difference in feelings between work and home will underestimate the true effect of the occupation on how the worker feels. Alternatively, if people who have bad jobs are particularly happy to go home from them, the difference in feelings between work and home will overestimate the effect of the occupation on feelings. As a result, the fixed-effects measures could be biased in either direction relative to the true change in feelings about work.

## **Conclusion**

The distribution of occupations has changed significantly in the post-World War II period. People feel differently about different occupations, and in addition, people in different demographic groups appear to feel differently about the same



occupations. Taking all of these factors together, we find substantial shifts both in the aggregate utility and disutility derived from work and in the distribution of that (dis-)utility across people.

Our work highlights how more measurement of the characteristics of work beyond income could offer insight on a number of large-scale questions. As one example, there has been a well-documented secular rise in wage and income inequality (Heathcote, Perri, and Violante 2010), in particular at the top of the distribution (Piketty and Saez 2003). Are rising wages at the top of the distribution (at least in part) a compensating differential for particularly demanding jobs, so that inequality in wages exceeds inequality in the total rewards of work? Or are the nonpecuniary benefits of work also increasingly concentrated at the top?

In addition, one of the biggest changes in the labor market in the postwar period has been the rise in women's participation. Yet little is known about the overall welfare consequences of this change because almost all research has assumed that wages are the sole benefit, and opportunity costs of time are the sole costs, of working. But as we show, men and women have different likelihoods of working in some occupations and sometimes feel differently on average about those occupations. Thus, we cannot simply extrapolate from the experience of men to calculate the costs and benefits of work for women. Furthermore, nonmarket work represents a large fraction of economic activity and of how people, especially women, spend their time (Aguiar and Hurst 2016; Waring 1988). Our approach could in principle be applied to measure feelings in nonmarket work and then analyze how aggregate feelings about *all* work—market and nonmarket—changed with shifts in labor force participation. We did not pursue that question because it is challenging to define a sharp boundary between nonmarket work and leisure in the data available to us, but such a study might help provide a more complete account of the implications of rising female labor force participation. Such an analysis could also consider changes in the utility of leisure time, following the study by Aguiar, Bils, Charles, and Hurst (2017) of how improvements in video games reduced employment among low-skilled young men.

Finally, our work provides a new perspective on an old question about the labor market: Why do people keep working full-time hours even as income levels have risen? (Or, for those concerned about whether robotics and artificial intelligence will lead to a sharp reduction in demand for labor, how much do people actually want to work?) In a famous essay, "Economic Possibilities for our Grandchildren," Keynes (1930) raised the possibility that as incomes rose, people would spend few hours working:

For many ages to come ... everybody will need to do some work if he is to be contented. We shall do more things for ourselves than is usual with the rich today, only too glad to have small duties and tasks and routines. But beyond this, we shall endeavour to ... make what work there is still to be done to be as widely shared as possible. Three-hour shifts or a fifteen-hour week may put off

the problem for a great while. For three hours a day is quite enough to satisfy the old Adam in most of us!

It is by now well known that, at least in a strict sense, this prediction of fewer hours worked has not yet been borne out. But Keynes' argument also hints at a possible reason why: Work is not motivated by wages alone. The prediction of fewer hours really should apply only to the component of work that produces disutility, not the component that produces positive utility. It is possible that, in the aggregate, people in wealthy countries do much less "work," in the sense of an activity that is a source of disutility, than in Keynes' time because more of the time spent working is associated with experiences that workers value positively. And it is also possible that these changes in the experience of working have been disproportionately felt in different parts of the income distribution and different demographic groups. However, there have not been attempts to measure changes in the aggregate nonwage aspects of work over time. This paper is a first small step in that direction.

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