Vanderbilt University Law School

Public Law & Legal Theory
Working Paper Number 16-23

Law & Economics
Working Paper Number 16-12

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This paper demonstrates that obese women are more likely to work in jobs that emphasize physical activity, but they are less likely to work in jobs that emphasize public interaction. The same patterns in occupational characteristics do not exist for obese men. In light of prior literature finding an unexplained wage gap between obese women and non-obese women, these results are particularly relevant since physical activity jobs pay relatively less on average, while public interaction jobs pay relatively more. Moreover, the few obese women who work in public interaction occupations receive lower wages than non-obese women, and their wage penalty offsets the general premium to working in a job emphasizing public interaction. Together, these results suggest that taste-based discrimination may be driving occupational sorting among obese women and, as a result, is at least one source of the wage penalty experienced by obese women.

Keywords: Obesity, O*NET, Compensating differentials, Women, Discrimination

JEL Codes: J16, J24, J31, J71, I10

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Numerous studies have documented a negative correlation between obesity and wages. A few of these studies, such as Cawley (2004), have suggested a causal link, demonstrating that, at least for females, obesity lowers wages. What is less well understood is *why* obesity lowers wages. This paper explores one potential explanation for why obesity lowers wages: differences in occupational characteristics between the obese and the non-obese.

The characteristics of occupations held by obese workers may differ from the characteristics of occupations held by non-obese workers for two reasons. First, obese workers may seek to avoid certain occupational characteristics made unpleasant by their obesity. If this labor supply story is correct, then obese workers would require a wage premium, or compensating differential, to compensate them for working in an occupation with such unpleasant characteristics.

Second, obesity may increase the costs of employment in occupations with certain characteristics. Obesity may lower a worker's ability to complete particular tasks, for example, or raise employers' costs of providing a worker with fringe benefits. Taste-based discrimination against the obese by employers (or their customers) likewise may increase the costs of employing the obese, particularly in occupations requiring frequent contact with these individuals. If any of these labor demand stories are correct, then employers would be unwilling to pay obese workers the same wages as non-obese workers in occupations with characteristics negatively affected by obesity.

This paper considers both the supply-side and the demand-side explanations in evaluating whether there are differences in the characteristics of occupations held by the obese, and how these differences might help explain the obesity wage penalty. Previous literature from the related fields of health and beauty has suggested two types of occupations in which obese

workers may be relatively underrepresented: physical activity occupations and public interaction occupations. Using matched data from the Current Population Survey (CPS), the American Time Use Survey's Eating and Health Module (ATUS EHM), and the Occupational Information Network (O*NET), I find that heavier women are less likely than their normal-weight counterparts to work in public interaction occupations, and the heaviest women who do work in these occupations encounter a wage penalty. Contrary to my initial predictions, however, I find that heavier women are more likely to work in physical activity occupations. Together, these results indicate that the wage penalty encountered by obese females in the labor market is the result of lower labor demand.

I. Previous Research on the Physical Qualities Affected by Obesity

Medically defined as a body mass index (BMI) of thirty or greater,[1] obesity is a twofold issue: it has the potential to impact both a person's health and a person's appearance.[2] Health researchers have linked obesity to the development of functional limitations in performing physical tasks, which in turn, could affect an individual's ability and willingness to perform physical tasks at work. Ferraro et al. (2002), for example, found in a panel study of adults ages twenty-five to seventy-seven that obesity increased an individual's self-reported likelihood of developing both an upper-body functional limitation (including dressing oneself, reaching for a five-pound object, and gripping) and a lower-body functional limitation (including standing up from a chair, climbing stairs, getting into a car, running errands, and doing light chores).

[1] Medical professionals calculate BMI according the following formula: $BMI = \frac{weight(kg)}{height(m)^2} = \frac{weight(lb)\times 703}{height(in)^2}$. The five medical classifications of BMI are as follows: underweight (BMI < 18.5), normal weight (18.5 ≤ BMI < 25.0), overweight (25.0 ≤ BMI < 30.0), obese (30.0 ≤ BMI < 40.0), and morbidly obese (BMI ≥ 40).

[2] For evidence on the underlying causes of obesity in the United States, see Courtemanche (2011) and Burke and Heiland (2007).

Alley and Chang (2007) reached similar conclusions in their study of adults ages sixty and older, finding that obesity increased an individual's likelihood of developing at least one functional limitation (defined in the study as a self-reported difficulty or inability to walk one-fourth mile, walk up ten stairs, kneel, lift ten pounds, walk between rooms, and stand from a chair). The increase was especially dramatic for morbid obesity, medically defined as a BMI of forty or higher. Similarly, a study of women ages forty-five to fifty-six by Hergenroeder et al. (2011) found that obese women not only self-reported lower rates of physical function than normal-weight women but also performed worse than normal-weight women at physical tasks assigned to them by the researchers, such as walking and standing from a chair.

In addition to obesity's potential impact on physical capabilities, obesity also has the potential to affect an individual's personal appearance. Rooth (2009) demonstrated that photos of white males and females who had been previously rated as attractive were later rated as unattractive after the photos had been manipulated to make these individuals appear obese. Similarly, Hersch (2011) showed that for white females, black females, and white males surveyed in the Detroit Area Study, obesity had a negative impact on their attractiveness ratings.

Attractiveness may also affect an individual's ability and willingness to work in certain types of occupations. For example, Biddle and Hamermesh (1994) demonstrated that attractive people were more likely to work in occupations requiring a high degree of interaction between employees and customers—such as sales, receptionist, cashier, and restaurant occupations. Biddle and Hamermesh (2001) showed that attractive attorneys were more likely to work in the private sector, where attorneys must attract their own clients, than in the public sector, where the client population is given. Similarly, Rooth (2009) demonstrated that both unattractiveness and

obesity had a particularly negative impact on interview callback rates for jobs requiring communication with the public, including sales occupations.

In sum, the health and beauty literature indicates that if there are systematic differences between the occupational characteristics of the obese and the non-obese, these differences should be most visible with regard to physical activity and public interaction characteristics. This literature provides little insight, however, into whether any observed differences in the occupational characteristics of obese workers may result from lower labor supply, lower labor demand, or both. In the next section, I introduce an empirical strategy that will help to address this supply versus demand question.

II. Empirical Strategy

Section I hypothesized that obese workers may be relatively underrepresented in physical activity and public interaction occupations, and their relative underrepresentation (whether the result of lower labor demand, lower labor supply, or both) may help explain at least some of the obesity wage penalty. Testing this hypothesis requires first determining whether the occupational characteristics of obese workers systematically differ from the occupational characteristics of non-obese workers through estimating the equation below:

$$j_i = X\theta + \rho O + \xi. \qquad (1)$$

The object of regression (1), which is modeled after a similar investigation of a worker's occupational characteristics conducted by Krueger and Schkade (2008), is to determine whether being obese has an effect on the occupational characteristics of a worker's job. In this regression, X is a vector of individual characteristics that commonly play a role in occupational and employment determination, such as education, age, race, marital status, presence of a child, and geographical region. The object of including X in regression (1) is to control for observable

differences in worker productivity because, in this analysis, I want to compare how occupational characteristics differ between obese and non-obese workers who are otherwise similar. Moreover, X includes controls for education; education will serve here as a control for expected wage, which I expect to have an effect on the occupational characteristics of a worker's job. O is an indicator variable equal to one if the individual is obese.[3]

The dependent variable, j_i, is a rating of how important an occupational characteristic of interest is to the worker's job. Thus, I will separately estimate regression (1) for each occupational characteristic that theory suggests may be relevant both to a worker's weight and to a worker's wage determination. As indicated in Section I, a rating of the importance of physical activity and a rating of the importance of public interaction will be the two ratings of interest (j_1, j_2) in the present study. If the theory presented in Section I is correct that obese workers are less likely to work in occupations emphasizing physical activity and public interaction, then ρ will be less than zero when j_1 and j_2 are separately regressed on X and O, as in equation (1).

Equation (1) will reveal whether obese workers are sorting into or out of physical activity and public interaction occupations. Yet equation (1) will say nothing regarding whether any occupational characteristic sorting is driven by labor supply-side pressures, labor demand-side pressures, or both. Nor can equation (1) say anything regarding whether occupational characteristic sorting may contribute to the obesity wage penalty. Addressing these issues requires estimating the standard hedonic wage equation (2) below:

$$\ln W = X\beta + J\gamma + \delta O + (O \cdot J)\mu + \varepsilon. \qquad (2)$$

[3] Note that in the above model, I assume for simplicity that only two BMI groups, obese and non-obese, exist. In the actual empirical analysis, I will consider all five medical classifications of BMI.

In this regression, the dependent variable, $\ln W$, is the natural logarithm of real wages. Otherwise, many of the components of regression (2) are similar to regression (1): X is the same vector of individual characteristics, and O is the same obesity indicator variable. J is a vector composed of the individual j_i ratings of interest from equation (1), and $O \cdot J$ is a vector of interaction terms that interacts whether the individual is obese with each occupational characteristic rating. Thus, a value of δ that is statistically different from zero in equation (2) represents the remaining wage gap for the obese that cannot be explained by variation in individual characteristics, the occupational characteristics of interest, or the interaction of these characteristics with obesity.

Together, equation (1) and (2) can shed light on whether obese workers sort out of jobs with certain types of characteristics, whether such sorting may contribute to the obesity wage penalty, and whether employers or obese workers themselves are driving the sorting. If equation (1) reveals that the occupational characteristics of obese workers are systematically different from those of non-obese workers, the value of γ in regression (2) will reveal whether these differences are contributing to the wage gap between obese and non-obese workers. A positive (negative) γ in regression (2) will indicate that jobs that emphasize an occupational characteristic of interest pay more (less) than jobs that do not emphasize the characteristic. If obese workers are less (more) likely than non-obese workers to hold jobs with positive-γ (negative-γ) occupational characteristics, then these differences in occupational characteristics will contribute to the wage gap between the obese and the non-obese.

Any differences in the occupational characteristics of the obese and the non-obese revealed in equation (1) must be the result of pressures at the margin from the labor supply-side, the labor demand-side, or both. Determining which side of the labor market is driving any differences requires examining the value of μ in equation (2). A positive (negative) μ will

indicate that the obese are paid more (less) than other weight groups for jobs that emphasize the occupational characteristic of interest.

If the supply-side story is correct, then any systematic differences in the occupational characteristics of the obese are the result of differences in obese workers' willingness to work. Obese workers will be more willing than non-obese workers to hold jobs that are made more pleasant by their obesity. Conversely, obese workers will be less willing to hold jobs that are made less pleasant by their obesity; the obese workers who do work in such occupations will demand a compensating differential. Note, however, that a compensating differential for the obese will only be observable (i.e., $\mu > 0$ in equation (2)) if a sufficient number of obese workers dislike a particular occupational characteristic since prices are set at the margin.

If the demand-side story is correct, then any systematic differences in the occupational characteristics of the obese are the result of differences in employers' willingness to pay. Employers will prefer obese workers over non-obese workers for any job in which obese workers are more productive or less costly to employ. On the other hand, employers will prefer non-obese workers for any job in which obese workers are less productive or more costly to employ; if an employer does hire an obese worker for such a job, the employer will not be willing to pay the obese worker as much as a non-obese worker. Again, since prices are set at the margin, a wage penalty against the obese will only be observable (i.e., $\mu < 0$ in equation (2)) if a sufficient number of employers find obese workers more costly to employ in a certain type of occupation (whether for productivity reasons, fringe benefit reasons, or taste-based discrimination reasons).

III. Data

Most prior studies on obesity and the labor market—including Averett and Korenman (1996), Pagan and Davila (1997), Cawley (2004), Baum and Ford (2004), Han et al. (2009),

Bhattacharya and Bundorf (2009), and Johar and Katayama (2012)—have used the National Longitudinal Survey of Youth (NLSY). Although the comprehensiveness of the NLSY is unparalleled among the datasets that collect both health and labor market characteristics, the NLSY is not ideal for the present study because, as its title suggests, the NLSY focuses on younger people. At the time of Cawley's (2004) study, for example, the oldest respondents to the NLSY were only forty-four. It is no secret that weight increases with age, while both physical abilities and beauty decline with age. As a result, if this study were to use the NLSY, the results may not be externally valid for the oldest labor market participants.

Fortunately, another dataset collects weight and height data from labor market participants spanning the entire age range. The EHM is a supplement to the ATUS administered between 2006 and 2008, which was designed to collect information on ATUS participants' eating habits, meal preparation, and health indicators—including participants' height and weight.[4] This height and weight information can be matched to participants' ATUS data, and the combined ATUS-EHM data can in turn be matched to participants' responses to the Current Population Survey Monthly Outgoing Rotation Group files (CPS). ATUS participants are drawn from households that are rotating out of CPS participation.

[4] Weight and height in the EHM is self-reported. Using self-reported weight and height data may raise concerns about systematic measurement error (in particular, systematic under-reporting of weight and/or systematic over-reporting of height), which could bias the results. Cawley (2004) developed a correction for self-reporting measurement error that uses NHANES data, which contains both self-reported weight and height as well as measured weight and height. Cawley (2004), Cawley et al. (2007), Lakdawalla and Philipson (2007), and Baum and Chou (2011) have all implemented the correction, but none of these authors have found that the correction changes their results in a meaningful way. A previous version of this paper also included Cawley's correction as a robustness check and similarly found that the results were substantially similar. A likely reason that the correction does not make much of a difference is that the specification used by previous authors (as well as the specification used by the present paper) is only sensitive to large errors in measurement of weight and height. By using BMI categories (as opposed to a continuous BMI variable), measurement error will only affect the estimation if a person has so underreported her weight (or overreported her height) that she moves from one BMI category to another (i.e. from morbidly obese to obese, from overweight to normal weight, etc.).

The CPS provides information on participants' employment characteristics (including wages, employment status, occupation, and industry), their demographic characteristics (including age, sex, race, ethnicity, marital status, presence of children, and education), and geographic characteristics.[5] Thus, the combined CPS-ATUS-EHM data contains information on each participant's weight, height, demographic characteristics, location, employment status, real hourly wages,[6] industry, and occupation. Note that this combined data only reveals the name of each participant's occupation; it says nothing about the skills and tasks required to perform the occupation. For this kind of occupational characteristic information, additional data are necessary from O*NET.

O*NET provides objective ratings of a wide variety of occupational characteristics and skill requirements for all occupations at the four-digit level. As the successor to the Dictionary of Occupational Titles (DOT), O*NET provides more comprehensive, nuanced measures of occupational characteristics than either the DOT or the sociological measures developed by England (1992).[7] Although O*NET has not been previously used to study the obesity wage

[5] The CPS-ATUS-EHM matched data lacks some of the measures included in the NLSY, such as intelligence test score, parents' education level, and information on sibling outcomes. Nonetheless, Cawley (2004) found that controlling for these additional factors (or alternatively, using sibling weight as an instrumental variable) does little to account for the large wage gap between obese women and non-obese women. Because the additional measures available in the NLSY data do not appear to reduce the obesity wage penalty, and because the CPS-ATUS-EHM data contain information on older labor market participants, the CPS-ATUS-EHM data are preferable to the NLSY for the present study.

[6] To calculate real hourly wages requires several steps. For workers paid by the hour who do not receive overtime, tips, and commissions, hourly wage data are directly available from the CPS. For all other workers with reported weekly earnings, I divide reported weekly earnings by usual hours worked to obtain hourly wages. I then multiply all top-coded weekly earnings using Barry Hirsch and David Macpherson's database of mean top-coded earnings, calculated by year and gender, available at http://www.unionstats.com. (For details on the database's construction, see Hirsch and Macpherson (2003).) Finally, I use the Consumer Price Index for all goods and services purchased by urban households in order to convert the hourly wages of 2006 and 2007 respondents into 2008 dollars.

[7] For example, the DOT records whether the following interpersonal skills are required for each occupation: mentoring, negotiating, instructing, supervising, persuading, speak-signaling, serving, taking instructions, and diverting. O*NET, in contrast, rates how important interpersonal skills are for each occupation. Only assessing requirements, instead of importance, is problematic because it ignores the fact that interpersonal skills may be helpful, even though not required, for an occupation. As a result, only a small handful of occupations are dichotomously characterized as interpersonal occupations—which can, in turn, lead to the small sample size problems encountered by Han et al. (2009). (Note that, despite their small sample of DOT interpersonal occupations,

penalty, it has been used in a similar context by Hirsch (2005) to study the part-time employment wage penalty, Hirsch and Schumacher (2012) to study the wage premium for nurses, and Hirsch and Manzella (2014) to study the wage penalty in caring occupations. O*NET has also been used in a similar context to study how workers' personal traits affect their occupational choice. Krueger and Schkade (2008), for example, used O*NET to demonstrate that extroverted workers sort into occupations that emphasize public interaction.[8]

This study uses O*NET 13.0, which was initially released in June 2008.[9] O*NET contains over 400 occupational characteristics, although approximately half of these ratings examine the same characteristic on different scales, and hence, are duplicative. This study uses only the O*NET characteristics rated on the importance and context rating scales, which both range from 1 (not important) to 5 (essential). For further ease of interpretation, the characteristic ratings are then rescaled from zero to one in the same manner as Hirsch and Manzella (2014).[10] Table 1 lists the O*NET occupational characteristics used in this study and divides them into seven broad categories: interaction with the public, interaction with coworkers and supervisors, general interaction, physical activity, mental skill, physical skill, and work conditions. As discussed in Section I, how obese workers fare in jobs emphasizing interaction with the public

Han et al. still concluded that the relationship between BMI and wages was particularly negative in interpersonal occupations.) Like the DOT, the sociological measures developed by England (1992) dichotomously characterize all jobs as either social or non-social based on the importance of authority and nurturing. Like the DOT, England's measures lack the nuance of the O*NET measures and may fail to identify the occupations in which public interaction is helpful or important, but not required. The lack of nuance in these measures may lead to underestimating the importance of public interaction. Nonetheless, Johar and Katayama (2012) used England's measures and still found that obese workers encountered a larger wage penalty in social jobs than in non-social jobs.

[8] Recent studies by Perri and Sparber (2009) and Chiswick and Miller (2010) have also used O*NET to examine the occupational characteristics of immigrants and how these characteristics affect their earnings.

[9] O*NET 13.0 was last updated in June 2009. Although the O*NET database is frequently revised and updated, the version of O*NET used does not appear to affect the results. An earlier version of this study used O*NET 4.0, and the results were virtually identical.

[10] The formula for rescaling the O*NET ratings is $R = \frac{O-L}{H-L}$, where O is the observed rating, H is the highest possible rating (here, 5), and L is the lowest possible rating (here, 1).

and in jobs emphasizing physical activity are of particular interest to this study; nonetheless, this study will control for all types of occupational characteristics.

Table 1 reveals a wide variety of measures relevant to each of the seven broad categories. Instead of examining each individual characteristic separately, which would be both repetitive and infeasible given space constraints, I use principal component factor analysis to construct factor(s) for each of the seven categories.[11] The number of principal component factors that result in each category are listed in Table 1.[12] Most important to this study, the public interaction characteristics combine into three factors, and the physical activity characteristics combine into one factor. The factor loading coefficients for the O*NET occupational characteristics are detailed in Appendix Table A.

Matching the O*NET characteristics to the CPS-ATUS-EHM data requires a two-step crosswalk procedure: first, I match O*NET's occupational codes to the closely related Standard Occupational Classification System (SOC) codes, and second, I match the SOC codes to the U.S. Census Codes used by the CPS-ATUS-EHM. This process results in a one-to-one match for most CPS occupations; however, some CPS occupations map onto two or more O*NET occupations. For these CPS occupations, the occupational characteristics are the weighted average of the O*NET occupational characteristics, using the same weighting procedure described Hirsch and Schumacher (2012) and the 2008 OES employment figures as weights. This procedure matches virtually all CPS occupations to O*NET occupations; the few remaining occupations are manually matched and weighted in the same manner as Hirsch and Schumacher's data.[13]

[11] A prior version of this paper examined some of the physical activity and public interaction ratings individually; the results are similar using this alternative approach.
[12] I retain all factors with an eigenvalue greater than one. By construction, all factor indices have a mean of zero and a standard deviation of one across the sample of men and women.
[13] Footnote 15 of Hirsch and Schumacher (2012) provides an excellent description of the matching process; the data here are matched in precisely the same manner. Note, however, that the results of this study are not sensitive to the

Together, the matched CPS-ATUS-EHM-O*NET dataset contains everything necessary to estimate equations (1) and (2). I restrict the final dataset used here to respondents between ages eighteen and sixty-five (inclusive) who are not currently pregnant. This restriction leaves 10,861 observations for men and 11,324 observations for women.[14]

IV. Results

Table 2 presents the summary statistics by BMI classification for men, and Table 3 presents the summary statistics for women. Turning first to men, obese men appear most readily distinguishable from normal-weight men: they are older, have slightly less education, have lower hourly wages, are more likely to be married with children, are more likely to work in both physical activity jobs, but are less likely to work public interaction jobs. Nonetheless, morbidly obese men appear remarkably similar to normal-weight men; morbidly obese men are only statistically distinguishable from normal-weight men in age. Although the lack of statistical difference may be partially due to the small sample of morbidly obese men (N=282), the point estimates for characteristics like education, being married, and presence of children are comparable between normal-weight and morbidly obese men. Most importantly for the present study, morbidly obese men appear just as likely as normal-weight men to work in both physical activity jobs and public interaction jobs.

In contrast to the lack of a consistent pattern in the men's data, a very clear pattern emerges by BMI classification for the women in Table 3. Overweight women are more likely than normal-weight women to be a member of a minority group and to work in a physical activity occupation. In contrast, overweight women have less education, lower wages, are less

use of weights in mapping two or more O*NET occupations onto one CPS occupation. Using simple averages, instead of weighted averages, provides very similar results.

[14] The number of observations with real hourly wage information is slightly smaller: 9,285 men and 10,162 women.

likely to have children, and are less likely to work in a public interaction occupation than normal-weight women. These patterns in the data become more pronounced as women increase in BMI classification from overweight to obese to morbidly obese. The summary statistics alone suggest that systematic differences may exist between the public interaction and physical activity occupational characteristics of obese and non-obese women. Yet because obesity is correlated with so many other factors, estimating regression (1) is necessary to determine whether these differences in occupational characteristics hold after the introduction of additional controls.

Estimations of equation (1) are presented in Table 4 for both men and women.[15] After controlling for age, race and ethnicity, geographic region, marriage, presence of a child, foreign national origin, and work sector, any correlations seen in the summary statistics between working in a public interaction or physical activity occupation largely disappear for men. Overweight men are more likely to work in occupations that emphasize the second public interaction factor (which is most heavily weighted towards communicating with people outside the organization, dealing with external customers, performing, and selling). Otherwise, no clear pattern exists between men's BMI classification and their occupational characteristics.

For women, however, the pattern seen in the summary statistics remains for the heaviest women in the labor market, even after the introduction of additional controls. Morbidly obese women are more likely than normal-weight women to work in physical activity occupations; they are less likely than normal-weight women to work in public interaction occupations—particularly occupations emphasizing the first public interaction factor, which is most heavily weighted towards negotiation, persuasion, public speaking, and consulting). Although the public interaction results for women are right in line with Section I's predictions, the physical activity

[15] Estimations of equation (1) for the other occupational characteristics used as controls in the wage regressions (Tables 5 and 6) are presented in Appendix Table B.

results are not. Instead of being less likely to work in physical activity occupations, the heaviest women the labor market are *more* likely to work in physically demanding jobs.

Given the health literature discussed in Section I, this surprising result immediately raises two questions: First, what types of physical jobs are held by the heaviest women in the labor market, and second, why are they working in such jobs? After examining the data, the physically demanding jobs held by morbidly obese women in the sample largely consist of healthcare support (such as nurse's aides and home health aides), healthcare practitioners (including registered nurses), food preparation, and childcare.

Why morbidly obese women occupy physically demanding jobs is a more difficult question. The explanation could be linked to the imperfection of BMI as a measure of obesity. BMI is merely a weight-to-height ratio; it does not capture muscle mass or fat percentage. As a result, the heaviest women in the labor market may work in physically demanding occupations because they are the only women strong enough to do so. Yet several factors render this explanation less compelling. First, if this explanation were true, we might expect to see this pattern to some extent in the men's data. But column 1 of Table 4 reveals no statistically significant relationship between a man's BMI classification and working in a physical activity occupation (in fact, the point estimate for morbidly obese men in column 1 is negative).

Second, recall from Table 1 that the physical activity factor is a measure of more than just strength. It is just as heavily weighted towards characteristics such as stamina, speed of limb movement, moving objects, standing, and walking—all activities with which the health literature suggests that obesity, and particularly morbid obesity, may interfere. Third, if this result for women with a BMI of greater than or equal to forty were purely driven by strength, we might expect the result to subside for women in even higher BMI ranges. Appendix Table C explores

this possibility. For comparison, a woman standing sixty-four inches tall with a BMI of forty would weigh approximately 235 pounds; the same woman with a BMI of forty-five would weigh approximately 265 pounds. At 265 pounds, the detriments of increased mass would plausibly begin to mitigate any benefits of increased strength. Although the precision of the estimate decreases due to small sample size, Appendix Table C reveals that the point estimate actually increases for women in the highest BMI ranges, so that women with a BMI of greater than or equal to forty-five are more likely to work in physical activity jobs than women with a BMI between forty and forty-five.

Table 4 indicates that the heaviest women in the labor market are more likely to work in physical activity occupations and are less likely to work in public interaction occupations than normal-weight women. No similar pattern appears in the data for the heaviest men. Although the BMI-based patterns of occupational sorting seen in the data for women are interesting and unexpected, more important for the present study is (1) whether the observed sorting is the result of labor supply- or demand-side pressures, and (2) whether it can account for any of the previously unexplained obesity wage penalty.

Tables 5 and 6 address these questions with estimates of the hedonic wage regression set out in equation (2) for men and women, respectively. In both tables, column 1 presents the baseline regression of wages on BMI classification, controlling only for demographics, geographic location, government sector, and union status. Column 2 adds the occupational characteristic factors of interest (physical activity and public interaction) as well as the other occupational characteristic factors discussed in Section III (coworker/supervisor interaction, general interaction, mental skill, physical skill, and work conditions). Column 3 adds broad occupation and industry dummy variables to account for any other skill differences not already

accounted for by the occupational characteristic factors. Column 4 adds interaction terms between BMI classification and the public interaction and physical activity factors. Column 5 makes the baseline specification richer by adding additional race controls, replacing the controls for age with controls for experience (defined as age minus years of education minus six), and by replacing the years of education variable with indicator variables for highest level of schooling completed. Finally, column 6 removes two potentially problematic groups from the wage regression: workers with imputed earnings and workers who classify themselves as full-time students.[16]

According to the wage regressions in Table 5, overweight men actually earn a wage premium compared to normal-weight men. Obesity is associated with neither a wage premium nor a wage penalty for men; nonetheless, morbid obesity is associated with a wage penalty of 7.8 percent[17] (approximately $2.13 per hour) even after controlling for differences in occupational characteristics, according to the estimate in column 6. The coefficients on the occupational characteristic factors are interpretable as the partial effect of a one standard deviation change in the factor of interest. Occupations emphasizing physical activity are associated with lower wages (an 11.2 percent wage penalty for a one standard deviation increase in the physical activity index, according to column 6). On the other hand, occupations emphasizing public interaction—particularly those emphasizing the first public interaction factor (negotiation, persuasion, public speaking, and consulting)—are associated with a wage premium. In column 6, the premium for one standard deviation increase in the first public interaction factor is 10.5 percent. The premium

[16] For full discussions of why including imputed earners in hedonic wage regressions when the coefficient of interest (here, BMI classification) is not a CPS earnings imputation match criterion, see Hirsch and Schumacher (2004) and Bollinger and Hirsch (2006).

[17] This percent was calculated from the relevant coefficient (0.081) in column 6 of Table 5 using the method outlined in Halvorsen and Palmquist (1980). All percent interpretations of the coefficients on dummy variables that are mentioned subsequently in the discussion of Tables 5 and 6 are also calculated in this manner.

for one standard deviation increase in the second public interaction factor (communicating with outside people, dealing with external customers, performing, and selling) is much smaller (around 2.5 percent), although its statistical significance is sensitive to specification.

Note that none of the interaction terms between BMI classification and working in a physical activity or public interaction occupation are significant for men in columns 4, 5, and 6. In other words, Table 5 does not provide any evidence of supply- or demand-side pressures particular to obese and morbidly obese men in physical activity or public interaction occupations. This result is consistent with the occupational characteristic regressions in Table 4, which indicated that heavier men were no more (or less) likely than normal-weight men to work in such occupations.

Table 6 paints a very different picture for women, however. Being heavier than normal weight is associated with a wage penalty for women, even after introducing additional controls. In column 6, for example, overweight women experience a wage penalty of about $0.94 per hour (4.0 percent); compare this figure to overweight men, who experience a wage premium of $2.13. The wage penalty experienced by heavier women increases as a woman's weight increases, so for morbidly obese women, the wage penalty quadruples. As in the case of men, public interaction jobs are associated with higher wages for women, while physical activity jobs are associated with lower wages. The wage premium for an occupation emphasizing the first public interaction factor again is larger than the wage premium emphasizing the second factor (7.9 and 6.3 percent increase in wages, respectively, for a one standard deviation factor increase). The wage penalty for physical activity occupations is 8.5 percent for a one standard deviation factor increase. Women's relative wages in public interaction and physical activity jobs are particularly

important given that heavier women are less likely to work in higher-paying public interaction jobs, but more likely to work in lower-paying physical activity jobs.

Turning to the specifications that include interaction terms between obesity and occupational characteristics (columns 4, 5, and 6), the point estimates are all negative, although most are far from statistically significant. The one exception is the interaction term between morbid obesity and working in a job that emphasizes the first public interaction factor. According to column 6, a one standard deviation increased emphasis on negotiation, persuasion, public speaking, and consulting translates to a 5.4 percent wage penalty for morbidly obese women. The overall wage premium for working in such jobs is 7.9 percent per standard deviation. Thus, the penalty specific to morbidly obese women in such jobs almost completely offsets the premium experienced by the rest of the labor market. Recall from Table 4 that morbidly obese women are already less likely to work in jobs emphasizing the first public interaction factor. Table 6 reveals that the few morbidly obese women who do work in such jobs endure a wage penalty not encountered by other women.

To place these results in context, consider what they can reveal about the principal questions of interest. For obese men, the results reveal very little. No clear relationship seems to exist between BMI classification and working in either a physical activity or a public interaction occupation. The heavier men who work in such jobs do not encounter a wage premium or penalty particular to them. Nonetheless, weight-based wage penalties appear much less of a concern for men than for women. After controlling for demographics, geography, and occupational characteristics, any wage penalty seen for obese men in Table 2's summary statistics disappears. This result is consistent with Cawley (2004), who also found that the wage penalty disappeared for obese men after controlling for other observables. Morbidly obese men

do appear to encounter an unexplained wage penalty of approximately 7.8 percent; still, this wage penalty is less than half the size of the penalty experienced by morbidly obese women.

On the other hand, the results are quite revealing for obese, and particularly morbidly obese, women. Differences in occupational characteristics explain a small portion of the wage gap between normal weight women and the heaviest women in the labor market. Looking back to the summary statistics presented in Table 3, obese women earn approximately $5.25 (22.3 percent) less per hour than normal-weight women; morbidly obese women earn approximately $8.12 (34.5 percent) less. A hedonic wage regression controlling for demographic and geographic characteristics (column 1 of Table 6) reduces the gap to $1.67 (7.1 percent) for obese women and $3.95 (16.8 percent) for morbidly obese women.[18] Once all controls for occupational characteristics (and the wage premiums or penalties associated with these characteristics) are introduced in column 6, the gap declines further to $1.36 (5.8 percent) for obese women and $3.69 (15.7 percent) for morbidly obese women. Thus, occupational characteristics explain some of the obesity wage penalty, although a sizeable, unexplained gap still remains between the wages of normal-weight women and the heaviest women in the labor market.

Still, the results in Table 6 are important for what they reveal about the labor supply- and demand-side pressures faced by the heaviest women in the labor market. Going back to the general theoretical framework discussed at the beginning of this paper, recall that any systematic differences between the occupational characteristics of the obese and the non-obese must be the result of labor supply-side pressures, labor demand-side pressures, or both. If the supply-side

[18] Cawley (2004) grouped obese and morbidly obese women together in his wage gap estimates; still, the above results are roughly comparable to his figures. Cawley estimated that white women with a BMI of thirty or greater earned between 8.7 and 11.9 percent less than normal-weight white women. For obese black women, the gap was between 0 and 7.7 percent less, and for obese Hispanic women, the gap was between 0 and 9.8 percent less. Note that Cawley only controlled for working in a part-time job or a white-collar job; he did not include occupation or industry indicator variables in his estimates.

story is correct, then any systematic differences in the occupational characteristics of the obese are the result of differences in obese workers' willingness to work. If the demand-side story is correct, then any systematic differences in the occupational characteristics of the obese are the result of differences in employers' willingness to pay.

The supply-side story is a mismatch for the empirical results presented here. Obese women are more likely to work in physical activity occupations—despite the fact that physical activity, if anything, is made less pleasant by obesity. Recall the Alley and Chang (2007) results showing that morbid obesity, in particular, dramatically increased an individual's likelihood of developing a functional limitation. And yet morbidly obese women are more likely to work in a physical activity occupation than normal-weight women.

On the other hand, morbidly obese women are less likely to work in public interaction occupations, which could be consistent with the supply-side story. But what happens to the wages of morbidly obese women working in public interaction occupations is inconsistent with the supply-side story. If the relatively lower numbers of morbidly obese women in public interaction occupations are the result of their lower willingness to work (because morbid obesity makes public interaction unpleasant), then the few morbidly obese women who do work in public interaction occupations should receive a compensating differential to make up for the fact that morbid obesity makes public interaction unpleasant. In reality, the hedonic wage regression results tell the opposite story: morbidly obese women in public interaction jobs encounter a wage penalty.

The demand-side story provides a much better fit with the empirical results for women. If employers are less willing to pay obese workers for certain types of occupational characteristics, then obese workers will face a wage penalty in jobs with these occupational characteristics.

Obese workers, as a result, will sort out of these jobs to avoid the wage penalty. According to the empirical results presented above, this demand-side model perfectly describes what is happening to heavier female workers—and in particular, to morbidly obese female workers—in occupations emphasizing public interaction.

V. Conclusion

The results presented here indicate that at least some of the wage penalty encountered by the heaviest women in the labor market is driven by employers. The question remains whether higher costs of employing obese women, lower productivity of obese women, or both are to blame for the lower labor demand of obese women in public interaction occupations. Attributing the results solely to lower productivity is difficult given the gender differences: whereas obesity seems to have no relationship with working in a physical activity or public interaction occupation for men, it has a strong relationship for women. Thus, a productivity-based explanation would have to provide a compelling explanation why obesity is unproductive for women who interact with the public, but not for men.

For example, psychologists Hatfield and Sprecher (1986) found that attractive communicators are more persuasive, so to the extent that obesity negatively impacts attractiveness, their study might explain why all obese workers are less productive in public interaction jobs. But it cannot explain why female obese workers alone are less productive. As another example, several medical studies have found a positive correlation between obesity and depression, with at least one meta-analysis finding simultaneous causality (i.e., obesity exacerbates depression, and depression exacerbates obesity) (Luppino et al. 2010). Given the evidence that depression and poor mental health lower productivity and wages (Cseh 2008, Baldwin and Marcus 2007, Jofre-Bonet et al. 2005), higher rates of depression among obese

individuals might explain why all obese workers are less productive in public interaction jobs. But again, it cannot explain why female obese workers alone are less productive.[19] Future psychology research should investigate whether obesity impacts women's mental health and social skills differently than men's. But in the absence of such research, it is difficult to attribute the underrepresentation of heavier females in public interaction occupations to productivity alone.

Higher cost to employers, therefore, seems a more plausible explanation as to why female obese workers—and not male obese workers—are sorting out of public interaction occupations. Future research may illuminate why female obese workers alone are more costly to employ in occupations emphasizing public interaction, but in the absence of any current evidence on this point, I consider one possible explanation: taste-based discrimination. Employers may be concerned that their customers consider obesity less palatable for women than for men. This idea that obesity is less palatable for women is not without basis in the psychology literature. Taylor (2011), for example, interviewed adolescent boys and girls about their attitudes regarding obesity and found that they would "rather be a fat guy than a fat girl" and believed that "it's more normal for guys to be overweight."

If customers indeed consider obesity less palatable for women, then their taste-based discrimination could explain why employers prefer to keep obese women out of public interaction roles in the workplace.[20] Customers who do not like dealing with an obese women

[19] This explanation is particularly unsatisfying given that Cseh (2008), Baldwin and Marcus (2007), and Jofre-Bonet et al. (2005) all find that the effects of depression on labor market outcomes are larger in magnitude and more negative for men than for women.

[20] The suggestion that taste-based discrimination may be responsible for differences in the occupational characteristics of obese females (and for the obesity wage penalty) runs contrary to the conclusions of a recent paper by Trombley (2013). Trombley assumed that if obesity discrimination existed at all, it would be most prevalent in occupations with a low percentage of obese workers and/or a high percentage of workers of the opposite gender. Trombley found that neither had a statistically significant effect on the wages of females, and thus, concluded that

may not buy from her (or her employer). In such a case, employers would try to avoid the costs associated with morbidly obese women by refusing to hire them for public interaction positions altogether, or they would try to recoup the costs by paying morbidly obese women less for public interaction positions. The evidence presented in this paper demonstrates that employers are behaving in precisely this manner. Thus, even though discrimination cannot be proven, the evidence here is consistent with taste-based discrimination against the heaviest women in the labor market.

there was no evidence of coworker or managerial discrimination. Trombley's different conclusions may arise from the fact that he was unable to control for detailed occupational characteristics, likely due to his small sample size.

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Table 1. O*Net Occupational Characteristic Variables Used to Create Principal Component Factors

Characteristics of Interest		Other Occupational Characteristics				
Physical Activity	Public Interaction	Coworker/ Supervisor Interaction	General Interaction	Mental Skill	Physical Skill	Work Conditions
Dynamic Strength	Communicating with Persons Outside Organization	Coaching and Developing Others	Contact with Others	Category Flexibility	Arm-Hand Steadiness	Cramped Work Space
Explosive Strength	Deal with External Customers	Communicating with Supervisors, Peers, or Subordinates	Face-to-Face Discussions	Deductive Reasoning	Auditory Attention	Deal with Physically Aggressive People
Kneeling	Negotiation	Cooperating	Interpersonal Relationships	Flexibility of Closure	Control Precision	Deal with Unpleasant or Angry People
Moving Objects	Performing or Working Directly with Public	Developing and Building Teams	Oral Expression	Fluency of Ideas	Depth Perception	Distracting or Uncomfortable Noise Levels
Physical Activity	Persuasion	Guiding, Directing, and Motivating Subordinates	Social Occupation	Inductive Reasoning	Dynamic Flexibility	Exposed to Contaminants
Reaction Time	Provide Consultation and Advice	Social Orientation	Speaking	Information Ordering	Extent Flexibility	Exposed to Disease
Speed of Limb Movement	Public Speaking	Working in Close Physical Proximity to Others		Mathematical Reasoning	Far Vision	Exposed to Hazardous Conditions
Stamina	Selling or Influencing Others	Working with a Team		Memorization	Finger Dexterity	Exposed to Hazardous Equipment
Standing				Number Facility	Glare Sensitivity	Exposed to High Places
Static Strength				Originality	Gross Body Coordination	Exposed to Minor Burns, Cuts, Bites, or Stings
Trunk Strength				Perceptual Speed	Gross Body Equilibrium	Exposed to Radiation

Walking		Problem Sensitivity	Hearing Sensitivity	Exposed to Whole Body Vibration
		Selective Attention	Manual Dexterity	Extremely Bright or Inadequate Lighting
		Speed of Closure	Multilimb Coordination	Frequency of Conflict Situations
		Time Sharing	Near Vision	Outdoors, Exposed to Weather
		Written Comprehension	Night Vision	Very Hot or Cold Temperatures
		Written Expression	Peripheral Vision	Wear Common Safety Equipment
			Rate Control	Wear Specialized Safety Equipment
			Response Orientation	
			Sound Localization	
			Speech Clarity	
			Speech Recognition	
			Visual Color Discrimination	
			Wrist-Finger Speed	

Table 2. CPS-ATUS-EHM-O*NET Summary Statistics for Men by BMI Classification

	(1)	(2)	(3)	(4)	(5)	(6)
	Full Sample	Underweight	Normal Weight	Overweight	Obese	Morbidly Obese
Black	0.101	0.132	0.096	0.093	0.114	0.128
Hispanic	0.143	0.387	0.120	0.143*	0.142	0.121
Years of Education	14.141	12.263	14.447	14.258*	13.840*	14.012
Age	41.356	37.470*	39.451	42.155*	42.258*	41.596*
Married	0.628	0.585	0.551	0.651*	0.671*	0.613
Children Present	0.563	0.610	0.537	0.568*	0.582*	0.493
Physical Activity	-0.037	0.292	-0.111	-0.052	0.031*	-0.075
Public Interaction 1	0.261	-0.185*	0.280	0.313	0.189*	0.323
Public Interaction 2	0.109	0.009	0.087	0.104	0.154*	0.085
Real Hourly Wages ($2008)	26.372	17.445*	27.266	27.426	24.904*	23.892
N	10,861	287	2,759	4,782	2,751	282

Notes: Reported estimates use respondents ages 18 to 65 from combined 2006-2008 CPS, ATUS, and EHM, and O*NET data. Note that the real hourly wage summary statistics only contain 9,285 observations. An * indicates a significant difference in the sample mean at the 10 percent level between the normal-weight group and the BMI classification group of interest according to a Bonferroni multiple comparison test.

Table 3. CPS-ATUS-EHM-O*NET Summary Statistics for Women by BMI Classification

	(1)	(2)	(3)	(4)	(5)	(6)
	Full Sample	Underweight	Normal Weight	Overweight	Obese	Morbidly Obese
Black	0.145	0.129*	0.080	0.173*	0.228*	0.277*
Hispanic	0.115	0.147*	0.097	0.119*	0.133*	0.104
Years of Education	14.194	13.766*	14.703	13.995*	13.699*	13.604*
Age	41.771	41.684*	40.193	42.977*	43.248*	43.042*
Married	0.531	0.533	0.550	0.552	0.488*	0.376*
Children Present	0.581	0.575	0.605	0.568*	0.557*	0.534*
Physical Activity	-0.360	-0.348	-0.419	-0.324	-0.313*	-0.246*
Public Interaction 1	0.108	0.026*	0.224	0.070*	-0.009*	-0.107*
Public Interaction 2	0.331	0.295	0.354	0.332	0.307	0.286
Real Hourly Wages ($2008)	20.879	19.392*	23.528	20.100*	18.284*	15.405*
N	11,324	1,007	4,664	3,021	2,228	404

Notes: Reported estimates use respondents ages 18 to 65 from combined 2006-2008 CPS, ATUS, and EHM, and O*NET data. Note that the real hourly wage summary statistics only contain 10,162 observations. An * indicates a significant difference in the sample mean at the 10 percent level between the normal-weight group and the BMI classification group of interest according to a Bonferroni multiple comparison test. Sample excludes pregnant women.

Table 4. The Effect of BMI Classification on Physical Activity and Public Interaction Occupational Characteristics

	Men			Women		
	Physical Activity	Public Interaction 1	Public Interaction 2	Physical Activity	Public Interaction 1	Public Interaction 2
Overweight	0.028	0.018	0.025	0.029	-0.010	-0.001
	(0.020)	(0.023)	(0.022)	(0.020)	(0.023)	(0.019)
Obese	0.033	-0.027	0.083***	0.008	-0.031	-0.016
	(0.023)	(0.027)	(0.025)	(0.023)	(0.026)	(0.021)
Morbidly Obese	-0.058	0.080	0.010	0.075*	-0.103**	-0.043
	(0.054)	(0.061)	(0.058)	(0.045)	(0.049)	(0.041)
R^2	0.301	0.288	0.023	0.106	0.274	0.026
N	10,861	10,861	10,861	11,324	11,324	11,324

*** p<0.01, ** p<0.05, * p<0.1

Notes: Reported estimates are from OLS regressions analyzing the combined 2006-2008 CPS, ATUS, EHM, and O*NET data. The dependent variables (at the top of each column) are factors comprised of the O*NET ratings described in Table 1. All regressions include controls for underweight, years of education, age, age squared, work sector (government, private), union status, married, presence of a child, black, Hispanic, geographic region (South, Midwest, and West), and urban area. Sample excludes pregnant women.

Table 5. The Effect of BMI Classification and Occupational Requirements on Men's Real Hourly Wages

	Dependent Variable: ln(Real Hourly Wage ($2008))					
	(1)	(2)	(3)	(4)	(5)	(6)
Overweight	0.030*	0.029*	0.026*	0.031**	0.035**	0.032**
	(0.017)	(0.016)	(0.016)	(0.015)	(0.015)	(0.015)
Obese	-0.002	0.006	0.003	0.006	0.011	0.002
	(0.018)	(0.017)	(0.017)	(0.016)	(0.016)	(0.017)
Morbidly Obese	-0.091**	-0.094***	-0.094***	-0.082**	-0.075**	-0.081**
	(0.038)	(0.036)	(0.036)	(0.035)	(0.035)	(0.036)
Physical Activity	---	-0.201***	-0.107***	-0.104***	-0.100***	-0.112***
		(0.026)	(0.030)	(0.035)	(0.035)	(0.037)
Public Interaction 1	---	0.104***	0.103***	0.117***	0.099***	0.105***
		(0.016)	(0.016)	(0.024)	(0.025)	(0.026)
Public Interaction 2	---	0.025**	0.024**	0.029*	0.023	0.025
		(0.011)	(0.012)	(0.015)	(0.015)	(0.016)
Obese*Physical	---	---	0.009	0.013	0.018	0.009
			(0.023)	(0.023)	(0.024)	(0.023)
Morbid*Physical	---	---	-0.012	-0.02	-0.016	-0.012
			(0.048)	(0.048)	(0.051)	(0.048)
Obese*Public 1	---	---	-0.019	-0.015	-0.014	-0.019
			(0.023)	(0.023)	(0.024)	(0.023)
Morbid*Public 1	---	---	-0.047	-0.044	-0.049	-0.047
			(0.049)	(0.049)	(0.051)	(0.049)
Obese*Public 2	---	---	0.005	0.008	0.002	0.005
			(0.016)	(0.015)	(0.016)	(0.016)
Morbid*Public 2	---	---	-0.030	-0.028	-0.029	-0.030
			(0.032)	(0.031)	(0.032)	(0.032)
Occupational Characteristic Factor Variables		X	X	X	X	X
Occupational Characteristic Factor Interactions			X	X	X	X
Occupation and Industry Indicator Variables				X	X	X

Alternate Experience, Race, and Education Controls					X	X
Imputed Earners and Full-Time Students Excluded						X
R^2	0.285	0.345	0.365	0.366	0.375	0.374
N	9,285	9,285	9,285	9,285	9,285	8,569

*** p<0.01, ** p<0.05, * p<0.1

Notes: Reported estimates are from OLS regressions analyzing the combined 2006-2008 CPS, ATUS, EHM, and O*NET data. The dependent variables (at the top of each column) are factors comprised of the O*NET ratings described in Table 1. All regressions include controls for underweight, government sector, union status, married, presence of a child, black, Hispanic, geographic region (South, Midwest, and West), and urban area. Regressions (1) through (3) also control for years of education, age, and age squared. Regressions (4) through (6) also control for experience to the quartic, Asian, other (non-white) race, and indicators for highest level of education (high school diploma, some college, associate, bachelor, master, professional, and doctoral). Occupational characteristic factor interactions, included in regressions (3) through (6), also include interactions between underweight and overweight BMI classifications, which are not reported here.

Table 6. The Effect of BMI Classification and Occupational Requirements on Women's Real Hourly Wages

	Dependent Variable: ln(Real Hourly Wage ($2008))					
	(1)	(2)	(3)	(4)	(5)	(6)
Overweight	-0.040***	-0.034***	-0.034***	-0.045***	-0.046***	-0.041***
	(0.014)	(0.013)	(0.013)	(0.015)	(0.014)	(0.015)
Obese	-0.074***	-0.064***	-0.063***	-0.061***	-0.061***	-0.060***
	(0.015)	(0.014)	(0.014)	(0.015)	(0.015)	(0.016)
Morbidly Obese	-0.184***	-0.179***	-0.173***	-0.175***	-0.167***	-0.171***
	(0.028)	(0.027)	(0.027)	(0.028)	(0.028)	(0.029)
Physical Activity	---	-0.186***	-0.098***	-0.077***	-0.085***	-0.085***
		(0.026)	(0.027)	(0.028)	(0.028)	(0.028)
Public Interaction 1	---	0.072***	0.072***	0.085***	0.073***	0.079***
		(0.013)	(0.014)	(0.015)	(0.016)	(0.016)
Public Interaction 2	---	0.048***	0.060***	0.065***	0.062***	0.063***
		(0.011)	(0.012)	(0.016)	(0.016)	(0.016)
Obese*Physical	---	---	-0.023	-0.026*	-0.019	-0.019
			(0.015)	(0.015)	(0.015(	(0.015)
Morbid*Physical	---	---	-0.012	-0.017	-0.015	-0.014
			(0.029)	(0.028)	(0.030)	(0.030)
Obese*Public 1	---	---	-0.013	-0.008	-0.008	-0.009
			(0.014)	(0.014)	(0.014)	(0.014)
Morbid*Public 1	---	---	-0.058**	-0.055**	-0.054**	-0.053**
			(0.024)	(0.024)	(0.025)	(0.025)
Obese*Public 2	---	---	-0.024	-0.025	-0.022	-0.022
			(0.017)	(0.017)	(0.018)	(0.018)
Morbid*Public 2	---	---	-0.016	-0.018	-0.008	-0.010
			(0.032)	(0.032)	(0.032)	0.032
Occupational Characteristic Factor Variables		X	X	X	X	X
Occupational Characteristic Factor Interactions			X	X	X	X
Occupation and Industry Indicator Variables				X	X	X

Alternate Experience, Race, and Education Controls					X	X
Imputed Earners and Full-Time Students Excluded						X
R^2	0.292	0.373	0.392	0.394	0.401	0.419
N	10,162	10,162	10,162	10,162	10,162	9,164

*** p<0.01, ** p<0.05, * p<0.1

Notes: Reported estimates are from OLS regressions analyzing the combined 2006-2008 CPS, ATUS, EHM, and O*NET data. The dependent variables (at the top of each column) are factors comprised of the O*NET ratings described in Table 1. All regressions include controls for underweight, government sector, union status, married, presence of a child, black, Hispanic, geographic region (South, Midwest, and West), and urban area. Regressions (1) through (3) also control for years of education, age, and age squared. Regressions (4) through (6) also control for experience to the quartic, Asian, other (non-white) race, and indicators for highest level of education (high school diploma, some college, associate, bachelor, master, professional, and doctoral). Occupational characteristic factor interactions, included in regressions (3) through (6), also include interactions between underweight and overweight BMI classifications, which are not reported here. Sample excludes pregnant women.

Appendix Table A. Principal Component Factor Loadings for Occupational Characteristics

Physical Activity	Factor 1
Dynamic Strength	0.105
Explosive Strength	0.057
Kneeling	0.089
Moving Objects	0.101
Physical Activity	0.105
Reaction Time	0.088
Speed of Limb Movement	0.102
Stamina	0.107
Standing	0.093
Static Strength	0.107
Trunk Strength	0.105
Walking	0.091

Public Interaction	Factor 1	Factor 2
Communicating with Persons Outside Organization	0.043	0.240
Deal with External Customers	-0.151	0.428
Negotiation	0.318	-0.095
Performing or Working Directly with Public	-0.225	0.486
Persuasion	0.326	-0.096
Provide Consultation and Advice	0.343	-0.169
Public Speaking	0.250	-0.068
Selling or Influencing Others	0.097	0.146

Coworker/Supervisor Interaction	Factor 1	Factor 2
Coaching and Developing Others	0.317	-0.097
Communicating with Supervisors, Peers, or Subordinates	0.211	0.008
Cooperating	-0.065	0.381
Developing and Building Teams	0.305	-0.046
Guiding, Directing, and Motivating Subordinates	0.346	-0.145
Social Orientation	-0.084	0.43
Working in Close Physical Proximity to Others	-0.164	0.383
Working with a Team	0.067	0.207

General Interaction	Factor 1
Contact with Others	0.024
Face-to-Face Discussions	0.144
Interpersonal Relationships	0.222
Oral Expression	0.232
Social Occupation	0.224
Speaking	0.220

Physical Skill	Factor 1	Factor 2	Factor 3	Factor 4
Arm-Hand Steadiness	-0.108	0.093	0.098	0.101
Auditory Attention	0.004	-0.127	0.200	0.046
Control Precision	0.020	0.144	0.045	-0.087
Depth Perception	0.103	0.007	0.038	-0.055
Dynamic Flexibility	-0.121	-0.138	-0.026	0.436
Extent Flexibility	-0.080	-0.022	0.004	0.279
Far Vision	0.092	-0.171	0.159	-0.008
Finger Dexterity	-0.157	0.077	0.279	-0.026
Glare Sensitivity	0.236	-0.018	-0.132	-0.061

Gross Body Coordination	-0.034	-0.110	-0.037	0.343
Gross Body Equilibrium	-0.017	-0.125	-0.005	0.304
Hearing Sensitivity	0.004	-0.098	0.222	-0.002
Manual Dexterity	-0.084	0.126	0.064	0.064
Multilimb Coordination	-0.002	0.020	0.004	0.128
Near Vision	-0.063	-0.042	0.268	-0.140
Night Vision	0.281	-0.014	-0.154	-0.117
Peripheral Vision	0.261	-0.027	-0.145	-0.075
Rate Control	0.082	0.138	-0.013	-0.116
Response Orientation	0.124	0.059	-0.022	-0.076
Sound Localization	0.238	-0.027	-0.101	-0.087
Speech Clarity	0.022	-0.345	0.105	0.141
Speech Recognition	-0.011	-0.370	0.166	0.169
Visual Color Discrimination	-0.072	-0.042	0.269	-0.007
Wrist-Finger Speed	-0.089	0.147	0.126	-0.037

Mental Skill			
	Factor 1	Factor 2	Factor 3
Category Flexibility	0.030	-0.004	0.166
Deductive Reasoning	0.142	-0.01	-0.012
Flexibility of Closure	-0.053	0.229	-0.003
Fluency of Ideas	0.191	-0.038	-0.092
Inductive Reasoning	0.175	-0.015	-0.073
Information Ordering	0.034	0.016	0.126
Mathematical Reasoning	-0.081	-0.111	0.479
Memorization	0.069	0.071	-0.014
Number Facility	-0.135	-0.054	0.492
Originality	0.200	-0.040	-0.116
Perceptual Speed	-0.186	0.263	0.141
Problem Sensitivity	0.132	0.112	-0.178
Selective Attention	-0.061	0.262	-0.056
Speed of Closure	-0.012	0.225	-0.053

Work Conditions			
	Factor 1	Factor 2	Factor 3
Cramped Work Space	0.094	0.017	0.043
Deal with Physically Aggressive People	0.020	0.332	0.003
Deal with Unpleasant or Angry People	0.0003	0.334	-0.006
Distracting or Uncomfortable Noise Levels	0.098	0.029	-0.077
Exposed to Contaminants	0.091	-0.021	0.073
Exposed to Disease	-0.031	0.103	0.433
Exposed to Hazardous Conditions	0.080	-0.062	0.146
Exposed to Hazardous Equipment	0.102	-0.051	-0.032
Exposed to High Places	0.096	0.009	-0.062
Exposed to Minor Burns, Cuts, Bites, or Stings	0.094	-0.02	-0.002
Exposed to Radiation	-0.023	-0.052	0.492
Exposed to Whole Body Vibration	0.091	0.015	-0.092
Extremely Bright or Inadequate Lighting	0.107	0.084	-0.087
Frequency of Conflict Situations	0.005	0.336	-0.050

Time Sharing	0.025	0.256	-0.231	Outdoors, Exposed to Weather	0.096	0.124	-0.180
Written Comprehension	0.163	-0.119	0.062	Very Hot or Cold Temperatures	0.113	0.055	-0.150
Written Expression	0.202	-0.128	-0.010	Wear Common Safety Equipment	0.080	-0.088	0.158
				Wear Specialized Safety Equipment	0.068	-0.029	0.213

Appendix Table B. The Effect of BMI Classification on Other Occupational Characteristics

Men

	Coworker/ Supervisor Interaction		General Interact-ion	Physical Skill				Mental Skill			Work Conditions		
	Factor 1	Factor 2	Factor 1	Factor 1	Factor 2	Factor 3	Factor 4	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3
Over-weight	0.052*	-0.015	0.014	0.077***	-0.026	0.016	0.010	0.002	0.060***	-0.018	0.050***	0.094***	-0.040**
	(0.028)	(0.020)	(0.020)	(0.024)	(0.020)	(0.022)	(0.022)	(0.020)	(0.022)	(0.022)	(0.019)	(0.021)	(0.020)
Obese	0.014	-0.016	0.007	0.134***	-0.019	0.045*	-0.033	-0.028	0.095***	-0.014	0.037*	0.130***	-0.056***
	(0.032)	(0.023)	(0.023)	(0.028)	(0.023)	(0.025)	(0.025)	(0.023)	(0.025)	(0.024)	(0.022)	(0.024)	(0.022)
Morbidly Obese	0.158**	0.006	0.058	0.083	-0.102*	0.050	-0.102*	0.141***	0.090*	-0.122**	-0.057	0.134**	-0.007
	(0.070)	(0.049)	(0.052)	(0.065)	(0.053)	(0.053)	(0.054)	(0.051)	(0.054)	(0.054)	(0.050)	(0.061)	(0.041)
R^2	0.084	0.069	0.278	0.072	0.228	0.017	0.164	0.337	0.033	0.069	0.260	0.100	0.037

Women

	Coworker/ Supervisor Interaction		General Interaction	Physical Skill				Mental Skill			Work Conditions		
	Factor 1	Factor 2	Factor 1	Factor 1	Factor 2	Factor 3	Factor 4	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3
Over-weight	0.018	0.062***	0.022	-0.023	-0.032*	0.057**	0.047*	-0.014	0.074***	0.024	-0.003	0.070***	0.032
	(0.027)	(0.021)	(0.018)	(0.016)	(0.019)	(0.026)	(0.025)	(0.020)	(0.021)	(0.026)	(0.011)	(0.021)	(0.025)
Obese	0.016	0.060***	0.019	0.007	-0.030	0.072**	0.007	-0.004	0.097***	-0.005	-0.002	0.083***	0.009
	(0.030)	(0.023)	(0.020)	(0.020)	(0.022)	(0.029)	(0.028)	(0.023)	(0.023)	(0.028)	(0.013)	(0.024)	(0.027)
Morbidly Obese	0.022	0.080*	-0.019	0.010	0.006	0.163***	0.046	-0.060	0.144***	0.052	0.017	0.117**	0.099*
	(0.056)	(0.045)	(0.040)	(0.041)	(0.044)	(0.053)	(0.053)	(0.048)	(0.043)	(0.057)	(0.026)	(0.048)	(0.055)
R^2	0.149	0.039	0.253	0.022	0.217	0.037	0.057	0.285	0.032	0.044	0.087	0.062	0.017

*** p<0.01, ** p<0.05, * p<0.1

Notes: Reported estimates are from OLS regressions analyzing the combined 2006-2008 CPS, ATUS, EHM, and O*NET data. All men's regressions contain 10,861 observations; all women's regressions contain 11,324 observations. The dependent variables (at the top of each column) are factors comprised of the O*NET ratings described in Table 1. All regressions include controls for underweight, years of education, age, age squared, work sector (government, private), union status, married, presence of a child, black, Hispanic, geographic region (South, Midwest, and West), and urban area. Sample excludes pregnant women.

Appendix Table C. The Effect of BMI Classification on Physical Activity Occupational Characteristics (Morbid Obesity Robustness Check)

	Men	Women
Overweight	0.024	0.027
	(0.020)	(0.020)
Obese	0.029	0.005
	(0.023)	(0.023)
Morbidly Obese 1 (40.0 < BMI ≤ 45.0)	-0.087	0.057
	(0.060)	(0.056)
Morbidly Obese 2 (BMI > 45.0)	0.026	0.098
	(0.114)	(0.070)
R^2	0.302	0.107
N	10,861	11,324

*** p<0.01, ** p<0.05, * p<0.1

Notes: Reported estimates are from OLS regressions analyzing the combined 2006-2008 CPS, ATUS, EHM, and O*NET data. The dependent variables (at the top of each column) are factors comprised of the O*NET ratings described in Table 1. All regressions include controls for underweight, years of education, age, age squared, work sector (government, private), union status, married, presence of a child, black, Hispanic, geographic region (South, Midwest, and West), and urban area. Sample excludes pregnant women.