Estimates of Wage Discrimination Against Workers with Sensory Disabilities, with Controls for Job Demands

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Abstract

We provide the first-ever estimates of wage discrimination against workers with sensory (hearing, speech, vision) disabilities. Workers with sensory disabilities have lower probabilities of employment and lower wages, on average, than nondisabled workers. Their poor labor market outcomes are explained, at least in part, by the negative productivity effects of sensory limitations in jobs that require good communication skills, but disability-related discrimination may also be a contributing factor.

To separate productivity vs. discrimination effects, we decompose the wage differential between workers with and without sensory disabilities into an 'explained' part attributed to differences in productivity-related characteristics, and an 'unexplained' part attributed to discrimination. The decomposition is based on human capital wage equations with controls for job-specific demands related to sensory abilities, and interactions between job demands and sensory limitations. The interactions are interpreted as measures of the extent to which a worker's sensory limitations affect important job functions.

The results indicate approximately 1/3 (1/10) of the disability-related wage differential for men (women) is attributed to discrimination. The estimates are quite different from estimates of discrimination against workers with physical disabilities obtained by the same methods, underscoring the importance of accounting for heterogeneity of the disabled population in discrimination studies.

Keywords: Job demand ; Sensory disability ; Wage discrimination

JEL classification codes: I10; J71

Introduction

Employers consistently rate communication skills among the most important factors they consider in evaluating current or potential employees (Mitchell, McMahon and McKee 2005). It is not surprising therefore, to find persons with sensory (hearing, speech, vision) disabilities have poorer outcomes in the labor market than nondisabled persons. While persons with sensory disabilities represent 5.5 percent of the U.S. population age 21-64, they are only 3.4 percent of the employed population (Brault 2008). Among those who are working, median earnings are 71 percent of the median earnings of nondisabled persons (Brault 2008). And compared to nondisabled persons, persons with sensory disabilities experience lower rates of promotion, less job stability, and a tendency to be underemployed relative to their education and work experience (Klein and Hood 2004; Kaye 2009)

The adverse employment outcomes experienced by workers with sensory disabilities are surely explained, at least in part, by the negative effects of poor communication skills on worker productivity, but disability-related discrimination may also play a part. Rankings of attitudes toward different health conditions indicate the average individual is uncomfortable interacting with persons who have serious difficulty hearing, seeing or speaking (Westbrook, Legge and Pennay 1993). The intensity of stigma is strong enough to suggest workers with sensory disabilities may be subject to discrimination in the labor market. Numerous empirical studies of disability-related discrimination have applied sophisticated econometric techniques to disentangle the productivity effects of health impairments from the effects of discrimination (see e.g., Baldwin and Johnson 2000; Kidd, Sloan and Ferko 2000; DeLeire 2000; Madden 2004; Jones 2008; Baldwin and Choe 2011) but no prior study focuses specific attention on workers with sensory disabilities.

Yet sensory disabilities differ in important ways from other types of disabilities. Unlike many physical or mental disorders, problems with hearing, speech or vision are observable even at initial stages of the hiring process, making it relatively easy for employers to discriminate against persons with these disorders (Baldwin and Johnson 2000). Sensory disabilities require different types of job accommodations (e.g. TDD connections, talking computers) than do other disabilities, and employers may perceive those accommodations to be more expensive or more disruptive to the workplace. Finally, sensory disabilities affect the most basic communication skills, which are important in almost every job in today's labor market. For all these reasons a separate study of discrimination against workers with sensory disabilities is both interesting and important.

Following the approach in a companion study focusing on physical disabilities (Baldwin and Choe 2011) we apply an enhanced decomposition technique and an expanded set of productivity controls to estimate the impact of discrimination on the wages of persons with sensory disabilities. We merge data from three panels of the Survey of Income and Program Participation (SIPP 1996-2004) to data on job demands for sensory abilities derived from the Occupational Information Network (O*Net). We include the job demands variables, and interaction effects between job demands and workers' sensory limitations, in the wage models on which our estimates are based. The interaction terms are interpreted as measures of the extent to which sensory disorders affect important functions of a worker's job.

The results reveal relatively large wage differentials between men (women) with sensory disabilities and their nondisabled counterparts. For women most of the wage differential is explained by between-group differences in productivity-related characteristics, leaving less than ten percent unexplained and attributed to discrimination. For men, however, more than thirty percent of the disability-related wage differential is unexplained and attributed to discrimination. Interestingly, our companion study of workers with physical disabilities shows exactly the opposite results for men and women. Comparisons between the two studies reinforce the concept that the group ‘persons with disabilities’ includes a number of heterogeneous subgroups with potentially very different experiences in the labor market.

Background

Stigma and discrimination against persons with sensory disabilities is fostered by stereotypes of such persons as confused, childlike, dependent, lacking in intelligence, and even dangerous (Klein and Hood 2004; McCaughey and Stromer 2005; Boyle, Blood and Blood 2009). The pervasiveness of stigma is reflected in everyday language where the names of sensory disorders often denote negative stereotypes. Common usages of the word *blind*, for example, refer to concealment (a ‘blind alley,’ ‘blind corner,’ or even ‘blind review’), folly (‘blind prejudice,’ being ‘blind to the consequences’) and out of control anger (‘blind rage’) (Bolt 2005). The word *deaf* is frequently used in expressions where it means an unwillingness to listen, reason, or reflect (as in ‘turning a deaf ear’ to an argument, ‘being deaf’ to any objections, or ‘falling on deaf ears’). The expressions echo the views of many ancient cultures that persons with hearing disabilities are inferior because they are unable to engage in intellectual debate (Stephens 2006). The word *stammer* shares its root with the word ‘barbaric’ meaning uncivilized or unsophisticated, as in someone who cannot speak the common language. Synonyms for stammering typically imply confusion (as in faltering, fumbling, hobbling, or wavering) and suggest stereotypes of persons with speech disorders as insecure, anxious, and lacking in confidence (Johnson 2008).

Studies of attitudes toward different health conditions confirm the stigma expressed in these stereotypes. When respondents are asked to rate how closely individuals in their community are willing to associate with persons who have different types of health conditions, persons with sensory disorders are somewhat more accepted than persons with epilepsy, but less accepted than persons with an amputated limb (Westbrook, Legge and Pennay 1993).

Complaints filed under the Americans with Disabilities Act (ADA) suggest the stigma associated with sensory disorders is, in fact, translated into discriminatory actions in the workplace. According to administrative data from the Equal Employment Opportunity Commission (EEOC), the agency charged with enforcing employment provisions of the ADA, between 1992 and 2003 nearly 14,000 allegations of workplace discrimination were filed by persons with sensory disorders and resolved by the EEOC (Bowe et al. 2005; Mitchell, McMahon and McKee 2005; Unger, Rumrill and Hennessey 2005). Of these 25 percent were found to be with merit, compared to 21 percent of allegations filed by persons with other types of disabilities. Allegations from persons with sensory disabilities were more likely to involve complaints of harassment, or discrimination in hiring or promotion than allegations from persons with other types of disabilities, likely reflecting the ease with which sensory disorders can be identified by co-workers, employers, and supervisors.

Despite the evidence of stigma and discrimination against persons with sensory disorders, and the data documenting their poor labor market outcomes, there have been no rigorous economic studies of the relative importance of discrimination vs. productivity effects in determining labor market outcomes for this group. The current study addresses this gap in the literature.

Data

We use data from the Survey of Income and Program Participation (SIPP) and the Occupational Information Network (*O*NET*) to estimate the potential impact of discrimination on the wages of men and women with sensory disabilities. The SIPP is a continuing series of national panels designed to capture representative data for the U.S. population on amounts and sources of income, personal and household characteristics, and participation in various cash and non-cash benefit programs. We merge data from three panels (SIPP 1996, 2001, 2004) to obtain adequate size samples of persons with sensory disabilities.

Information on job demands for sensory abilities comes from the Occupational Information Network (*O*NET*). The O*Net data provide numerical rankings of the importance of various attributes (abilities, knowledge, skills, etc.) to the functions of jobs defined by 5-digit SOC codes. We use the O*Net data to construct ten measures of job demands describing the importance of sensory attributes in specific occupations. The job demands variables are merged to SIPP by matching workers' five-digit occupation codes. (Appendix A provides further details and information to access the data sets.)

We define a study group of persons with sensory disabilities and a comparison group of persons without disabilities. Persons with sensory disabilities are those who report a hearing, speech or vision impairment 'limits the kind or amount of work they can do,' 'makes it difficult to get or keep a job,' and/or 'limits the kind or amount of work they can do around the house.' Persons without disabilities are those who report none of the above work limitations. Persons who report a work limitation associated primarily with a physical or mental disability are excluded.

The samples are restricted to working-age persons (age 18 to 65) who have completed formal schooling. Persons who report positive earnings in the month prior to interview are considered to be employed. Workers who are self-employed or working in a family business without pay, and workers who do not report regular work hours are excluded. Also excluded are workers whose occupation code cannot be matched to the O*Net data, or whose calculated wages are in the extreme tails of the wage distribution (less than $2 or more than $300 per hour).[2]

All analyses are conducted separately for men and women. The final samples include 1,122 men (1,297 women) with sensory disabilities, of whom 16 (12) percent are employed; and 28,262 men (34,686 women) in the nondisabled comparison groups, of whom 83 (65) percent are employed.

Methods

Employer discrimination can be expressed either as a downward shift in the offer wage function for a disadvantaged group (disadvantaged workers experience a wage penalty, *d*, at every productivity level) or a change in slope of the function (disadvantaged workers earn lower returns to productivity-related characteristics than their nondisabled counterparts). Oaxaca (1973) introduced to the economics literature a method for decomposing *observed* wage differentials that captures both effects; Reimers (1983) extended the method to decompose *offer* wage differentials from selectivity-corrected wage equations; Neuman and Oaxaca (2004) extended the methods to decompose *observed* wages with a decomposition of

[2] Overall we lose 17,062 observations because occupation codes cannot be matched to the O*Net data, and 5,035 because of other exclusion criteria.

the difference in sample selection terms. We apply the latter method to estimate the potential impact of discrimination on the wages of workers with sensory disabilities.

Wage models. To begin, we estimate selection-corrected wage equations separately for workers with and without sensory disabilities (*(j=S, NS* respectively*)*. The reduced form wage model is:

$$\ln w_i = \alpha_j + \beta_j X_i + \sigma_j F_i + \gamma_j Y_i + \delta_j (Y_i * F_i) + \theta_j \lambda_i + \varepsilon_i \,. \qquad (1)$$

where ln w_i is the natural logarithm of the hourly wage of the i^{th} worker; X_i is a vector of variables controlling for demographic, human capital, and job-related characteristics that influence wages; F_i is a vector of four binary variables identifying workers with sensory limitations (difficulty hearing, seeing, speaking or using the telephone); Y_i is a vector of job demands indicating the importance of sensory abilities to the functions required in the i^{th} worker's occupation; λ_i is the sample selection variable controlling for differences in the propensities of workers with and without sensory disabilities to choose work over leisure time; and ε_i is an error term with standard normal distribution.[3]

The job demands variables (Y_i) are 10 measures of the importance of sensory attributes (e g. near vision, speech recognition, speech clarity) to the functions required in workers'

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[3] The sample selection term (λ_i) is generated from a preliminary probit model of the decision to work (Heckman 1979). The model includes the same controls for demographic characteristics, human capital (education, health) and sensory limitations as are included in the wage model. The system is identified by also including household characteristics (marital status, children) and non-labor income in the employment function. Means and coefficient estimates for the employment model are available upon request.

narrowly-defined occupations. The importance rankings, derived from O*Net, are on an integral scale from 0 to 100 where a score of 40 or above indicates a sensory ability is ‘important’ in a worker’s occupation, 60 or above indicates ‘very important,’ and 80 or above indicates ‘extremely important’ (Tsacoumis and Willison 2010).

The interaction terms ($Y_i * F_i$) equal the O*Net rating of the importance of a sensory attribute (Y_i) to a worker’s job functions *if* the worker reports a sensory limitation associated with that attribute ($F_i =1$); otherwise the value of the interaction term is zero ($F_i =0$). For example, the O*Net rating of importance of near vision to the job functions of data entry keyers is 72 ('very important'). For a data entry keyer who reports a vision limitation (difficulty seeing words and letters in ordinary newsprint), the value of the interaction term between vision limitation and near vision is 72. For his fellow worker with no vision limitation the value of the interaction is zero. The interaction terms can be interpreted as measures of the extent to which a worker's sensory limitations affect productivity on the job; hence coefficients in the vector δ_j are expected to be negative.

The complete mapping of sensory limitations to job demands that defines the interaction terms is shown in Table 1. Definitions of all explanatory variables in the wage model are provided in Table 2.

Wage Decompositions. The Neuman and Oaxaca (2004) decomposition separates the difference in mean log wages between two groups of workers into an explained part, attributed to between-group differences in means of characteristics in the wage *and* employment functions, and an unexplained part attributed to differences in returns to those characteristics (as measured by coefficients of the wage *and* employment functions). For our specification of the wage model the decomposition formula is:

$$\ln \overline{w}_{ND} - \ln \overline{w}_{D} = \underbrace{\begin{array}{l}\hat{\beta}_{NS}(\overline{X}_{NS} - \overline{X}_{S}) + \hat{\sigma}_{NS}(\overline{F}_{NS} - \overline{F}_{S}) + \hat{\gamma}_{NS}(\overline{Y}_{NS} - \overline{Y}_{S}) \\ + \hat{\delta}_{NS}((\overline{Y}_{NS} * \overline{F}_{NS}) - (\overline{Y}_{S} * \overline{F}_{S})) + \hat{\theta}_{NS}(\overline{\lambda}_{NS} - \overline{\lambda}_{S}^{0})\end{array}}_{Explained} \\ \underbrace{\begin{array}{l} + (\hat{\alpha}_{NS} - \hat{\alpha}_{S}) + \overline{X}_{S}(\hat{\beta}_{NS} - \hat{\beta}_{S}) + \overline{F}_{S}(\hat{\sigma}_{NS} - \hat{\sigma}_{S}) + \overline{Y}_{S}(\hat{\gamma}_{NS} - \hat{\gamma}_{S}) \\ + (\overline{Y}_{S} * \overline{F}_{S})(\hat{\delta}_{NS} - \hat{\delta}_{S}) + (\hat{\theta}_{NS}\overline{\lambda}_{S}^{0} - \hat{\theta}_{S}\overline{\lambda}_{S})\end{array}}_{UnExplained}. \qquad (2)$$

The first five terms on the right hand side of equation (2) represent the difference in mean log wages *explained* by between-group differences in means of productivity-related characteristics *(X),* sensory limitations *(F),* job demands *(Y),* interaction effects *(Y*F),* and characteristics that determine the sample selection term *(λ).* The last six terms represent the *unexplained* difference in mean wages attributed to differences in estimated parameters (slopes and y-intercepts) of the wage and employment functions. The unexplained differential is an estimate of the effects of discrimination on the wages of workers with sensory disabilities.[4]

[4] The decomposition of sample selection terms is based on a hypothetical mean, $\overline{\lambda}_{S}^{0}$, created by substituting characteristics of individuals with sensory disabilities into the employment function for nondisabled individuals. That is,

$$\overline{\lambda}_{S}^{0} = \sum_{i=1}^{N_S} [\phi(H_{iS}\hat{\eta}_{NS}) / \Phi(H_{iS}\hat{\eta}_{NS})] / N_S \qquad (3)$$

where *H* is the vector of control variables in the employment function, with associated parameter vector *η*. Refer to Neuman and Oaxaca (2004) for details.

The Neuman and Oaxaca (2004) decomposition method is, in some sense, more complete than previous methods because it includes a decomposition of the difference in sample selection terms on the right hand side. Still, the estimator of discrimination is a residual representing the wage differential that cannot be explained by control variables in the employment and wage functions. If important variables are omitted from the models, wage differences associated with the omitted characteristics will appear in the unexplained differential, potentially biasing the estimates of discrimination.

Many prior studies using the decomposition approach assume the explained wage differential increases, and the unexplained differential (the estimator of discrimination) decreases, as previously omitted variables are added to the wage model. Thus, the authors often refer to their estimates as 'upper bounds' of the 'potential' effects of discrimination. In fact, the bias from omitted variables can go in either direction because adding variables that associate higher productivity and higher returns with disadvantaged groups (e. g. work experience in our model) *reduces* the part of the wage differential explained by productivity differences and *increases* the estimate of discrimination. For this reason we refer to unexplained wage differentials simply as 'estimates' of discrimination.

To see how the inclusion of job demands and interaction terms affects our results, we estimate three versions of the wage model and associated decompositions. The first model excludes job demands altogether; the second adds job demands without interaction effects; the third includes both job demands and interaction terms.

Results

Employment and wages. Employment rates for the disabled groups in our samples are less than one-fifth of employment rates for their nondisabled counterparts (16% vs. 83% for men, 12% vs. 65% for women), and far lower than the 40 to 60 percent employment rates for persons with sensory disabilities reported by the Census (Brault 2008). The difference is likely explained by different definitions of disability and by the additional exclusion criteria we impose on our samples.[5]

The disability-related gap in wages is smaller than the employment gap. Men with sensory disabilities in our sample earn 74 percent of the mean wage of nondisabled men ($17.73 vs. $23.81) while women with sensory disabilities earn 87 percent of the mean wage of nondisabled women ($15.33 vs. $17.53). These estimates are in line with Census reports of median earnings for persons with sensory disabilities ranging from 63 percent (speech disorders) to 90 percent (hearing disorders) of nondisabled earnings (Brault 2008).

The comparatively large employment differentials between persons with and without sensory disabilities may be attributed, in part, to the disincentive effects of non-wage income on work effort. Over 50 percent of persons with disabilities in our samples have non-wage income in excess of $500 per month, compared to less than 10 percent of nondisabled persons. Recipients of disability income from programs such as Social Security Disability Insurance (SSDI) and Supplemental Security Income (SSI) face particularly strong work disincentives

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[5] In particular, our definition restricts the samples of disabled persons to those who report their condition "limits the kind or amount of work they can do," but the Census definition does not. Also, we exclude employed persons from our samples if they have missing or unreliable data, if occupation codes do not match the O*Net data, or if they are self-employed.

because their monthly stipend and health insurance benefits may be withdrawn if earnings exceed program limits (Schur 2003).

Descriptive statistics. Table 2 reports means for control variables in the wage model for each study group. By definition, workers with sensory disabilities have higher rates of functional limitations (difficulty hearing, seeing, or speaking) than nondisabled workers. Relative to nondisabled workers, workers with sensory disabilities are also more likely to work part-time, to have co-morbid physical or mental disabilities, and to have lower levels of education, all of which contribute to explaining the disability-related wage differential. On the other hand, workers with sensory disabilities have more work experience, on average, than nondisabled workers, which should have a countervailing effect.

One striking result is the large gender difference in the prevalence of sensory limitations among the disabled groups. Hearing disorders are much more prevalent among men (63% vs. 39%) while vision disorders are more prevalent among women (58% vs. 36%).[6] The data are consistent with patterns in population statistics calculated from the American Community Survey (ACS) showing the male/female prevalence ratio for hearing (vision) disorders is 1.75 (0.95) in a working-age population (Erickson, Lee and von Schrader 2010).

Results for the job demands variables indicate workers with sensory disabilities tend to be employed in jobs where sensory abilities are less important than in the jobs which nondisabled workers hold. The between-group differences are small however, suggesting it is

[6] The distributions by disability type do not sum to 100 because individuals may report more than one type of sensory disability. Some (nondisabled) workers report sensory limitations but do not say those limitations affect their ability to work.

difficult for workers with sensory disabilities to find jobs where their functional limitations have little impact on productivity. As expected, means of the interaction terms are close to zero for the nondisabled groups (because few nondisabled workers report sensory limitations). Means of the interaction terms are also small for disabled groups when the interactions involve speaking abilities, likely because workers with speech disorders represent less than 15 percent of our samples.

Wage models. Tables 4A (men) and 4B (women) report coefficient estimates for three specifications of the wage equations. In general, the demographic, human capital, and job-related (part-time employment, union membership) variables are significant with expected signs in the models estimated for nondisabled workers, but insignificant in the models estimated for workers with sensory disabilities. The exceptions are having some college education, which has a significant positive effect on the wages of women with disabilities, and work experience (job-specific and general), which has significant positive effects for both men and women with disabilities. Interestingly, returns to work experience are greater for workers with sensory disabilities than for nondisabled workers, a result in sharp contrast with our companion study of workers with physical disabilities (Baldwin and Choe 2011).

Results for the job demands variables (Models 2 and 3) indicate jobs in which speaking abilities (speech clarity, speaking, public speaking) are important are associated with lower wages, on average, while jobs in which seeing (near vision, reading comprehension, reading and writing letters) or hearing (recognizing speech, active listening, participating in discussions) abilities are important are generally associated with higher wages.

Estimated coefficients of the functional limitations variables are generally negative, as expected, in models with no interaction terms (Models 1 and 2). The effects are seldom significant, however, likely reflecting the low prevalence of limitations among the nondisabled samples and the overall small sample sizes of the disabled groups. Adding interaction terms to the model (Model 3) changes the effect of sensory limitations on wages, many of the coefficients even become positive. But when the effects of limitations and interaction terms are combined, the overall impact of sensory limitations is still negative for workers in jobs where sensory abilities are important.[7]

Wage decompositions.

Tables 4A (men) and 4B (women) report wage decompositions between workers with and without sensory disabilities for three specifications of the wage model. The results for men show that approximately one-third of the observed wage differential is unexplained and attributed to discrimination; the results for women suggest a much smaller discrimination effect (less than 10 percent of the wage differential).

[7] Consider, for example, a man with seeing limitations employed in a job where seeing is moderately important (O*Net scores for near vision, reading comprehension, and reading/writing letters are 50). The estimated coefficient for difficulty seeing changes from -0.217 (Model 2) to 0.766 (Model 3) with interaction effects included. The marginal effects of the relevant interaction terms are: near vision (-0.001*50), reading comprehension (-0.021*50), and reading/writing letters (0.003*50). Together the interaction terms have a marginal impact of -0.950. Therefore, despite the large positive coefficient for difficulty seeing in Model 3, the overall impact of seeing limitations is still negative (0.766-0.950) for workers in jobs where seeing abilities are at least moderately important.

Turning first to the decompositions for men:

- The typical model without controls for job demands (Table 4A, Model 1) indicates 63 percent of the disability-related wage differential is explained by differences in education, industry, occupation, co-morbidities, sensory limitations, and selection effects; 37 percent is unexplained and attributed to discrimination.
- Including job demands (Model 2) adds more nuanced information on occupation to the model so the part of the wage differential explained by occupational differences (occupation + job demands) increases. Other elements of the decomposition change in the opposite direction, however, so the addition of job demands has almost no impact on the estimate of discrimination effects.
- When interaction terms are included (Model 3) the explained part of the wage differential increases to 67 percent because the combined effect of interactions, sensory limitations and co-morbid health conditions is *greater* than the effect of limitations and co-morbidities alone in Model 2. This model explains 67 percent of the observed wage gap between men with and without sensory disabilities, leaving 33 percent unexplained and attributed to discrimination.

In the results for women:

- The standard decomposition (Model 1) indicates that 99 percent of the disability-related wage differential is explained, primarily by differences in education, occupation, sensory limitations and co-morbid health conditions, leaving only 1 percent attributed to discrimination.
- Adding job demands (Model 2) has no effect on the estimate of discrimination because (similar to the results for men) the increased contribution to the explained differential

from occupational differences (occupation + job demands) is offset by decreased contributions of other variables (e. g. industry, sensory limitations).

- The addition of interaction terms (Model 3) has a different impact on the decompositions for women than for men. In particular, when interaction terms are included the combined effect of interactions, sensory limitations, and co-morbid health conditions is *smaller* than the effect of limitations and co-morbidities alone (Model 2). As a result the explained part of the differential decreases to 92 percent and the estimate of discrimination increases to 8 percent. (Here is an example of a case in which adding variables to the wage model *decreases* the explained wage differential and *increases* the estimate of discrimination.)

Comparisons to results for physical disabilities. In a companion study we estimate discrimination effects for workers with physical disabilities using data from the 2004 SIPP and the same methods, variable definitions, and exclusion criteria as in the present study (Baldwin and Choe 2011). Table 5 compares descriptive statistics and decomposition results (Model 3) from the two studies. As shown by the wage ratios reported in column 3 the disability-related wage gap is greater for men and women with sensory disabilities than for their counterparts with physical disabilities, suggesting sensory disabilities impose a greater handicap in the labor market. Additionally, the wage gap is greater for men with either physical or sensory disabilities than for women with similar disabilities.

The wage gap between men with and without *physical* disabilities is almost entirely explained by differences in productivity-related characteristics, leaving less than 10 percent attributed to discrimination. In contrast, one-third of the wage gap between men with and without *sensory* disabilities is attributed to discrimination. The decomposition results for women are almost an exact opposite: Less than 10 percent of the wage gap between women with and without *sensory* disabilities is attributed to discrimination, compared to one-fourth of the wage gap between women with and without *physical* disabilities.

The most disadvantaged workers in terms of relative wages and the impact of discrimination are *men with sensory disabilities.* The wage gap between men with and without sensory disabilities is large in both relative (0.74) and absolute ($6.08 per hour) terms, and one-third is attributed to discrimination.

Discussion

Occupational segregation, disability, and discrimination. Our results show the combined effects of productivity losses and discrimination have a greater impact on the wages of workers with sensory than physical disabilities. The results are consistent with the importance of sensory abilities in today's labor market, and with the strong negative stereotypes associated with hearing, speech and vision disorders. Our results also show large gender differences in the relative importance of productivity vs. discrimination effects and these findings are, perhaps, more difficult to understand. We speculate the differences are associated with the way gender-based occupational segregation affects the match (or mismatch) between workers' functional limitations and important functions of their jobs.

Patterns of occupational segregation by gender typically 'assign' jobs in which physical abilities are most important (e.g. fire-fighters, construction and maintenance workers) to men, while jobs in which sensory abilities are most important (e.g. social workers, child care workers, clerks, secretaries and bookkeepers) are often 'assigned' to women. Our O*Net data are consistent with these patterns: mean importance scores for physical job demands are greater for men, while means for sensory demands are greater for women. It follows that, on average, sensory disabilities have a greater impact on the productivity of women than of men because a greater proportion of women are “mismatched” in jobs where sensory abilities are very important. By similar reasoning physical disabilities, on average, have a greater impact on the productivity of men than women because a greater proportion of men are “mismatched” in physically-demanding jobs. In both cases (women with sensory disabilities and men with physical disabilities) the decomposition attributes most of the wage differential to productivity effects and only a small fraction to discrimination.

The other two disabled groups (men with sensory disabilities and women with physical disabilities) are more likely to be “matched” to jobs where their limitations do not affect important job functions. The matching occurs because occupational segregation generally assigns jobs with more physical demands to men and jobs with more sensory demands to women. Decompositions for the “better-matched” groups show a smaller part of the wage differential attributed to productivity effects (and a larger part attributed to discrimination) than for the groups more likely to be “mismatched.” If our arguments based on occupational segregation are correct, the results suggest employers do not account fully for the match between workers’ functional limitations and important job functions when making wage offers to disabled workers. Hence we find a sizable unexplained wage gap for groups who, because of gender-based occupational segregation, tend to be well-matched into jobs where their limitations have less impact on productivity.

The scenario we outline is consistent with ‘statistical’ theories of discrimination in which unexplained wage differentials are rooted in employer uncertainty regarding the productivity of workers from disadvantaged groups (Aigner and Cain 1977). When confronted with hiring decisions involving disadvantaged (e. g. disabled) workers an employer resolves her uncertainty by using perceived characteristics of the group as indicators of individual productivity. The negative stereotypes of persons with sensory disabilities as incompetent, unreliable, unable to reason, etc. may cause employers to associate sensory disabilities with significant productivity losses, and to make low wage offers to this group.

Our results suggest employers ‘get it about right’ for women with sensory disabilities (and men with physical disabilities) because more than 90 percent of the observed wage differential is explained by productivity effects. Employers err by underestimating the productivity of men with sensory disabilities (and women with physical disabilities) many of whom are well matched into jobs where their limitations do not affect important job functions.

Limitations

The problem of omitted variables discussed above is a limitation common to all discrimination studies using a residual as estimator of discrimination. We minimize the effect of omitted variables by using the SIPP data, an unusually rich resource for studies of disability-related discrimination. The SIPP includes good measures of work history, job characteristics, individual and socioeconomic characteristics, health and functional limitations. The job demands variables from O*Net expand our ability to control for occupational differences, but no doubt some important determinants of wages are still omitted from the models. Even in the most complete model we likely cannot control for all important determinants of productivity and the decision to work, but we believe these are the best estimates of discrimination effects that can be obtained within the limits of our data.

Another limitation relates to the relatively meager controls for sensory limitations available on the SIPP. The O*Net data are much richer with respect to sensory attributes than the SIPP data, but we cannot make full use of the O*Net attributes without corresponding limitations variables from the SIPP. For example, we cannot interact attributes such as 'night vision' and 'far vision' to the limitations of individuals on SIPP because the only question on visual limitations relates to near vision (the ability to read words and letters in newsprint). To the extent we are restricted by the SIPP data we cannot control fully for the relationships between workers' sensory limitations and the demands of their jobs.

Finally, we are limited by small samples sizes of workers with sensory limitations. Although we merge data from three panels of SIPP to obtain reasonable sized samples of persons with sensory disabilities overall, rates of employment are so low that our samples of workers are quite small. Hence the wage models and sample means (Tables 2, 3A, 3B) are estimated less precisely for the disabled groups. Even among the nondisabled groups so few report any type of sensory limitations that estimated coefficients for the limitations variables and interaction terms are generally insignificant for these groups as well. Coefficients that are measured imprecisely may bias the estimates of discrimination. There is little we can do to address this limitation, except to note the problem is common to most discrimination studies which apply the decomposition technique to workers with disabilities, because they represent such a small part of the labor force. We believe it is better to acknowledge the limitation and be cautious in interpreting results, than to abandon the exercise altogether.

Conclusion

We provide first-ever estimates of wage discrimination against workers with sensory disabilities. Our models include controls for job-specific demands for sensory attributes, and interaction terms between workers' sensory limitations and job demands. The results suggest one-third of the disability-related wage differential for men is unexplained and attributed to discrimination, compared to less than one-tenth of the differential for women. The results are in sharp contrast to our companion study of workers with physical disabilities, where we find discrimination accounts for a larger portion of the wage differential for women.

We speculate that a complex interplay between occupational segregation, wage discrimination, and workers' functional limitations explains the contrasting results. Because of culturally defined 'male' and 'female' jobs, men and women with sensory or physical disabilities have different probabilities of being "matched" to jobs which minimize the impact of their functional limitations. Groups that are "better-matched" encounter more discrimination in the labor market because their productivity is (mistakenly) evaluated by the negative stereotypes associated with sensory disabilities.

In theory, workers with disabilities have incentives to match themselves into jobs where their functional limitations have less impact on important job functions. Their job prospects may be limited, however, by the stereotypes associated with different types of disabilities or different types of jobs, and by the timing of onset of disability. The relationships between these variables and work outcomes have not been adequately studied because we are only beginning to take account of the heterogeneity of the disabled population in discrimination studies. As we begin to explore the relationships between disability, job demands, and occupational segregation we may also increase our understanding of the sources of discrimination against workers with disabilities.

Appendix A. Data

The Survey of Income and Program Participation (SIPP), sponsored by the U.S. Bureau of the Census, collects nationally representative data on income sources and participation in various government programs from successive cohorts (panels) of U.S. households. Each panel represents 9-12 waves of data collected every four months from the same households. The sample of households changes when a new panel begins.

The 1996, 2001, and 2004 panels consist of 12, 9, 12 waves of data respectively. Each wave includes core questions asked at every interview and topical module questions asked periodically. We use data from the core questionnaire accompanying Wave 5 of each panel for information on employment and wages, human capital, and demographic characteristics; from the topical module accompanying Wave 1 for information on work history; and from the topical module accompanying Wave 5 for information on health, disability, and sensory limitations. The SIPP data can be downloaded at http://www.census.gov/sipp/access.html.

The Occupational Information Network (*O*NET*), supported by the U.S. Department of Labor, provides numerical values on a 0-100 scale to describe the importance of 52 distinct attributes to jobs within five-digit SOC codes. We use the data to construct measures of job demands that control for the importance of sensory attributes to job functions within workers' specific occupations. Sensory attributes appear throughout the O*Net data, but we select only those that correspond directly to sensory limitations defined on SIPP. For example, the O*Net 'abilities' category includes numerous attributes related to vision (e.g. near vision, far vision, peripheral vision, night vision) but we select only one, near vision, as directly related to the SIPP question "Do you have difficulty seeing words and letters in ordinary newsprint?" In total, ten sensory attributes from the O*Net data are related to the four SIPP questions on sensory limitations (The other questions are: “Do you have difficulty hearing what is said in ordinary conversation?” “Do you have difficulty having your speech understood?” “Do you have difficulty using the telephone?”) See Table 1 for the complete mapping of sensory limitations to job demands. The O*Net data are available at http://www.onetcenter.org/

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Table 1. Mapping of Interaction Terms between Sensory Limitations and Job Demands

Job demands	Limitations			
	Seeing	Hearing	Speaking	Telephone
Abilities				
Near vision	√			
Speech recognition		√		
Speech clarity			√	
Basic skills				
Active listening		√		
Reading comprehension	√			
Speaking			√	
Interpersonal relationships				
Discussions		√	√	
Letters	√			
Public speaking			√	
Telephone		√	√	√

Table 2. Means (Standard Deviations) for Variables in the Wage Model

	Variable definition	Men		Women	
		Nondisabled	Disabled	Nondisabled	Disabled
Wage	Hourly wage rate ($)	23.81 (21.30)	17.73 (11.36)	17.53 (14.24)	15.33 (22.75)
Demographic and work-related variables					
White	Binary =1 if ethnicity is white	0.85 (.36)	0.85 (.36)	0.80 (.40)	0.78 (41)
Part-time	Binary =1 if works < 35 hours/week	0.17 (.37)	0.37 (.48)	0.33 (.47)	0.57 (.50)
Union	Binary =1 if union member	0.16 (.37)	0.20 (.40)	0.10 (.29)	0.08 (.27)
Less high school	Less than high school degree	0.08 (.27)	0.16 (.37)	0.06 (.24)	0.11 (.32)
Some college	High school degree. < 4-year college degree	0.33 (.47)	0.33 (.47)	0.39 (.49)	0.42 (.50)
College graduate	4-year college degree or above	0.27 (.45)	0.14 (.35)	0.22 (.42)	0.13 (.33)
Job-specific exp	Years worked for present employer	8.48 (8.87)	9.74 (9.85)	7.14 (7.67)	7.74 (8.17)
General exp	Years worked for other employers	8.72 (10.38)	13.19 (12.78)	9.57 (10.29)	15.18 (12.08)
Missing exp	(Age-years in school-5)-(years employed)	4.40 (8.31)	6.75 (11.15)	5.14 (8.15)	7.46 (9.72)
Co-physical	Binary=1 if co-morbid physical health condition	0.01 (.08)	0.68 (.47)	0.01 (.10)	0.84 (.37)

Co-mental	Binary=1 if co-morbid mental health condition	0.003 (.06)	0.40 (.49)	0.005 (.07)	0.40 (.49)
Functional limitations (as percentages)					
Difficulty seeing	Difficulty seeing words/letters in newsprint	0.79 (8.87)	35.52 (47.99)	1.13 (10.56)	57.89 (49.54)
Difficulty hearing	Difficulty hearing what is said in conversation	1.73 (13.05)	62.84 (48.46)	0.87 (9.29)	39.47 (49.04)
Difficulty speak	Difficulty having speech understood	0.25 (5.04)	14.21 (35.01)	0.17 (4.07)	13.16 (33.91)
Difficulty phone	Difficulty using an ordinary telephone	0.11 (3.26)	16.39 (37.12)	0.07 (2.72)	15.79 (36.58)
Job demands (the degree to which a worker's job requires…)					
Near vision	Seeing details at close range	62.39 (4.79)	61.83 (5.18)	62.09 (6.09)	60.52 (5.65)
Recognize speech	Understanding the speech of another person	59.64 (8.33)	58.35 (7.77)	63.34 (7.59)	60.73 (8.25)
Speech clarity	Speaking clearly so others can understand	60.57 (9.60)	58.91 (8.79)	64.33 (8.33)	61.75 (9.36)
Active listening	Paying attention to what others are saying	63.95 (9.92)	62.29 (9.68)	67.57 (8.61)	64.49 (9.31)
Reading comp	Understanding written documents	58.06 (12.00)	55.62 (11.37)	59.78 (11.44)	56.69 (12.31)
Speaking	Talking to others to convey information	61.94 (11.43)	60.29 (11.02)	65.97 (9.74)	62.25 (11.35)
Discussions	Having face-to-face discussions	87.48 (8.65)	86.02 (8.74)	87.11 (10.86)	84.98 (11.94)
Letters	Communicating by letter or memo	53.53 (20.32)	50.39 (19.54)	58.41 (18.60)	53.96 (19.93)
Public speaking	Performing public speaking	24.85 (13.28)	22.24 (12.04)	25.37 (11.73)	22.93 (11.05)

Telephone	Having telephone conversations	79.23 (21.89)	75.33 (21.52)	84.45 (20.60)	77.20 (25.20)
Interaction terms (between job demands and limitations variables)					
Near vision^lim	Job demands near vision^seeing	0.49 (5.52)	22.05 (29.92)	0.70 (6.54)	34.65 (29.95)
Recog speech^lim	Job demands speech recognition^hearing	1.02 (7.73)	35.97 (28.32)	0.54 (5.84)	23.74 (29.99)
Speech clear^lim	Job demands speech clarity^speaking	0.14 (2.87)	8.30 (20.80)	0.10 (2.54)	8.20 (21.32)
Listening^lim	Job demands listening^hearing	1.08 (8.25)	38.32 (30.46)	0.58 (6.25)	24.97 (31.74)
Reading^lim	Job demands reading^seeing	0.45 (5.20)	20.34 (28.33)	0.65 (6.25)	32.44 (29.27)
Speaking^lim	Job demands speaking^speaking	0.14 (2.91)	8.49 (21.34)	0.11 (2.65)	8.39 (21.85)
Discussions^lim	Job demands discussions^hearing or speaking	1.65 (11.93)	58.27 (40.48)	0.86 (8.60)	41.17 (43.19)
Letters^lim	Job demands letter writing^seeing	0.43 (5.09)	18.12 (27.17)	0.63 (6.19)	31.21 (30.65)
Public speak^lim	Job demands public speaking^speaking	0.05 (1.19)	2.97 (8.43)	0.04 (0.99)	2.87 (8.82)
Telephone^lim	Job demands telephone^speaking, hearing, phone	1.43 (10.73)	56.10 (37.42)	0.85 (8.59)	42.48 (42.82)
1996 SIPP	Observations from 1996 panel	0.33 (.47)	0.31 (.46)	0.34 (.47)	0.33 (.47)
2000 SIPP	Observations from 2000 panel	0.29 (.46)	0.27 (.45)	0.28 (.45)	0.24 (.43)
2004 SIPP	Observations from 2004 panel	0.38 (.48)	0.42 (.49)	0.38 (.49)	0.43 (.50)

Table 3A. Coefficient Estimates for the Wage Models - Men

	Model 1		Model 2		Model 3	
	Nondisabled	Disabled	Nondisabled	Disabled	Nondisabled	Disabled
White	0.046***	0.061	0.038***	0.015	0.038***	0.083
Part-time	-0.027***	-0.045	-0.022**	0.008	-0.022**	0.091
Union	0.185***	0.122	0.194***	0.162	0.193***	0.150
Less high school	-0.099***	-0.161	-0.087***	-0.159	-0.087***	-0.164
Some college	0.100***	0.022	0.090***	-0.007	0.090***	-0.016
College graduate	0.405***	-0.120	0.381***	-0.162	0.381***	-0.214
Job-specific exp	0.015***	0.019***	0.014***	0.017***	0.014***	0.020***
General exp	0.006***	0.009*	0.006***	0.007	0.006***	0.009*
Missing exp	0.007***	0.005	0.006***	0.004	0.006***	0.008
Co-physical	-0.108**	0.082	-0.106**	0.084	-0.118**	0.094
Co-mental	0.070	0.109	0.066	0.116	0.054	0.114
1996 panel	0.104***	-0.143	0.104***	-0.124	0.104***	-0.137
2001 panel	0.085***	-0.016	0.084***	0.016	0.084***	0.012
Difficulty seeing	-0.031	-0.278**	-0.035	-0.217*	0.134	0.766
Difficulty hearing	-0.002	-0.093	0.000	-0.050	0.412	0.543
Difficulty speak	-0.163**	-0.106	-0.152**	-0.095	-0.046	0.213
Difficulty phone	0.028	-0.060	0.030	-0.056	0.033	0.150
Near vision	--	--	0.000	-0.024**	0.000	-0.025**
Recognize speech	--	--	0.002	0.014	0.002	0.001
Speech clarity	--	--	-0.007***	-0.023	-0.007***	-0.026
Active listening	--	--	0.007***	0.021	0.007***	0.044**

Reading comp	--	--	0.006***	0.013	0.006***	0.022**
Speaking	--	--	-0.001	-0.010	-0.001	-0.007
Discussions	--	--	0.003***	0.015**	0.003***	0.016**
Letters	--	--	-0.001**	0.005	-0.001**	0.001
Public speaking	--	--	0.000	-0.017***	0.000	-0.019***
Telephone	--	--	0.001***	0.003	0.001***	0.007
Near vision^lim	--	--	--	--	0.004	-0.001
Recog speech^lim	--	--	--	--	-0.005	0.012
Speech clear^lim	--	--	--	--	0.008	0.022
Listening^lim	--	--	--	--	-0.001	-0.025
Reading^lim	--	--	--	--	-0.017**	-0.021
Speaking^lim	--	--	--	--	-0.008	-0.039
Discussions^lim	--	--	--	--	-0.000	0.007*
Letters^lim	--	--	--	--	0.011***	0.003
Public speak^lim	--	--	--	--	-0.004	0.027*
Telephone^lim	--	--	--	--	0.000	-0.005*
Inverse Mills ratio	-0.415***	-0.273***	-0.402***	-0.313***	-0.402***	-0.344***
r^2	0.34	0.32	0.35	0.38	0.35	0.39
F (limitations)	5.439	5.743	5.050	4.305	2.955	2.471
F (interactions)	--	--	--	--	12.469	12.040

Note: *** p<0.01, ** p<0.05, * p<0.1. F statistics are reported for joint significance of the functional limitations variables and of the interaction terms. Models also include 13 industry and 6 occupation categories. Complete results available from the authors.

Table 3B. Coefficient Estimates for Wage Equations - Women

	Model 1		Model 2		Model 3	
	Nondisabled	Disabled	Nondisabled	Disabled	Nondisabled	Disabled
White	0.060***	-0.001	0.050***	0.015	0.050***	0.108
Part-time	-0.025***	0.053	-0.014*	0.053	-0.014*	-0.014
Union	0.112***	0.204	0.131***	0.241	0.131***	0.197
Less high school	-0.054***	0.140	-0.033**	0.132	-0.034**	0.111
Some college	0.092***	0.308***	0.074***	0.293***	0.075***	0.283**
College graduate	0.412***	0.186	0.380***	0.191	0.380***	0.133
Job-specific exp	0.016***	0.024***	0.015***	0.023***	0.015***	0.026***
General exp	0.003***	0.011**	0.003***	0.011**	0.003***	0.011**
Missing exp	0.002***	-0.002	0.002***	-0.002	0.002***	-0.005
Co-physical	-0.069	-0.070	-0.073	-0.110	-0.071	-0.108
Co-mental	-0.014	0.167	-0.017	0.180*	-0.015	0.155
Difficulty seeing	-0.070*	-0.112	-0.071*	-0.072	-0.068	2.397**
Difficulty hearing	0.002	-0.256**	0.004	-0.233*	0.455	0.154
Difficulty speak	-0.010	0.186	0.010	0.203	-0.222	0.380
Difficulty phone	0.006	0.148	0.017	0.134	0.088	0.090
Near vision	--	--	0.002**	0.004	0.002**	0.026
Recognize speech	--	--	-0.001	0.009	-0.001	0.008
Speech clarity	--	--	-0.008***	-0.025	-0.008***	-0.009
Active listening	--	--	0.014***	0.001	0.014***	-0.015
Reading comp	--	--	0.005***	0.005	0.005***	0.004
Speaking	--	--	-0.005***	0.002	-0.006***	0.001

Discussions	--	--	-0.001*	-0.002	-0.001*	-0.004
Letters	--	--	0.000	0.002	0.000	0.000
Public speaking	--	--	0.001	-0.005	0.001	-0.005
Telephone	--	--	0.002***	0.003	0.002***	0.003
Near vision^lim	--	--	--	--	-0.000	-0.044**
Recog speech^lim	--	--	--	--	-0.012	-0.046
Speech clear^lim	--	--	--	--	-0.001	-0.069*
Listening^lim	--	--	--	--	0.005	0.034
Reading^lim	--	--	--	--	0.001	0.003
Speaking^lim	--	--	--	--	0.010	0.064*
Discussions^lim	--	--	--	--	0.000	0.001
Letters^lim	--	--	--	--	-0.000	0.003
Public speak^lim	--	--	--	--	-0.014*	-0.005
Telephone^lim	--	--	--	--	-0.001	0.004
Inverse Mills ratio	-0.261***	-0.309***	-0.256***	-0.318***	-0.256***	-0.327***
r^2	0.32	0.34	0.33	0.36	0.33	0.41
F (limitations)	3.077	9.451**	3.367	8.519*	2.737	5.205
F (interactions)	--	--	--	--	6.305	16.165*

Note: *** p<0.01, ** p<0.05, * p<0.1. F statistics are reported for joint significance of the functional limitations variables and of the interaction terms. Models also include 13 industry and 6 occupation categories. Complete results available from the authors.

Table 4A. Decompositions of Wage Differentials between Men with and without Sensory Disabilities

	Model 1[a]		Model 2[b]		Model 3[c]	
	Explained	Unexplained	Explained	Unexplained	Explained	Unexplained
Demographics	-0.001	--	-0.002	--	-0.002	--
Work experience	-0.059***	-0.074	-0.058***	-0.026	-0.058***	-0.105
Education	0.062***	--	0.057***	--	0.057***	--
Industry	0.013***	--	0.011***	--	0.011***	--
Occupation	0.027***	--	0.016***	--	0.016***	--
Co-morbidities	0.045	--	0.045	--	0.058	--
Sensory limitations	0.030	--	0.028	--	-0.297	--
Job demands	--	--	0.022***	-0.098	0.022***	-1.271
Interactions	--	--	--	--	0.324	0.575
Year	-0.001***	--	-0.001***	--	-0.001***	--
Intercept	--	0.035	--	0.042	--	0.678
Inverse Mills	0.046***	0.135*	0.045***	0.177**	0.045***	0.207***
Total	0.162***	0.096*	0.163**	0.095*	0.174***	0.084
%	63%	37%	63%	37%	67%	33%

Notes: Asymptotic variances for components of the decompositions are estimated with the delta method (Oaxaca and Ransom 1998). In the unexplained part, the intercept includes the effects of education, industry, occupation. *** indicates significant at the .01 level or better, ** at the .05 level or better, and * at the .10 level or better.

Table 4B. Decompositions of Wage Differentials between Women with and without Sensory Disabilities

	Model 1[a]		Model 2[b]		Model 3[c]	
	Explained	Unexplained	Explained	Unexplained	Explained	Unexplained
Demographics	0.009***	--	0.007***	--	0.007***	--
Work experience	-0.033***	-0.148	-0.032***	-0.146	-0.032***	-0.149
Education	0.040***	--	0.037***	--	0.037***	--
Industry	0.018***	--	0.014***	--	0.014***	--
Occupation	0.047***	--	0.026***	--	0.026***	--
Co-morbidities	0.063	--	0.067	--	0.065	--
Sensory limitations	0.039	--	0.035	--	-0.122	--
Job demands	--	--	0.030***	0.678	0.030***	-0.203
Interactions	--	--	--	--	0.146	1.261
Year	0.001**	--	0.001*	--	0.001*	--
Intercept	--	-0.101	--	-0.796	--	-1.169
Inverse Mills	0.011	0.252**	0.011	0.267**	0.011	0.277**
Total	0.195***	0.003	0.195***	0.003	0.182***	0.016
%	99%	1%	99%	1%	92%	8%

Notes: Asymptotic variances for components of the decompositions are estimated with the delta method (Oaxaca and Ransom 1998). In the unexplained part, the intercept includes the effects of education, industry, occupation. *** indicates significant at the .01 level or better, ** at the .05 level or better, and * at the .10 level or better.

Table 5. Comparison of Potential Discrimination Effects for Workers with Physical vs. Sensory Disabilities

	Mean wage (log)		Wage ratio (disabled/ nondisabled)	Decomposition (Model 3)		
	Nondisabled	Disabled		Log wage differential	Explained component	Unexplained component
Men						
Physical	$23.42	$18.79	0.80	0.18	92%	8%
disabilities[a]	(2.92)	(2.70)		(100%)		
Sensory	$23.81	$17.73	0.74	0.26	67%	33%
disabilities	(2.94)	(2.68)		(100%)		
Women						
Physical	$18.11	$16.71	0.92	0.09	74%	26%
disabilities[a]	(2.69)	(2.60)		(100%)		
Sensory	$17.53	$15.33	0.87	0.19	92%	8%
disabilities	(2.65)	(2.46)		(100%)		

Notes: [a]Results reported in Baldwin and Choe (2011).