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The effects of a psychosocial dimension of socioeconomic position on survival: occupational prestige and mortality among US working adults

Sharon L. Christ[1], Lora E. Fleming[2], David J. Lee[3], Carles Muntaner[4], Peter A. Muennig[5] and Alberto J. Caban-Martinez[6]

[1]*Department of Human Development and Family Studies and the Department of Statistics, Purdue University, West Lafayette, USA*
[2]*European Centre for Environment and Human Health (PCMD), Cornwall, UK and University of Miami OHH Center and NIOSH Research Group, Miami, USA*
[3]*Department of Epidemiology and Public Health and the Bascom Palmer Eye Institute, University of Miami School of Medicine, Miami, USA*
[4]*Bloomberg Faculty of Nursing and Dalla Lana School of Public Health, University of Toronto, Canada*
[5]*Department of Health Policy and Management, Mailman School of Public Health, Columbia University, New York, USA*
[6]*Department of Epidemiology and Public Health, University of Miami School of Medicine, Miami, USA*

Abstract The association between education or income and mortality has been explored in great detail. These measures capture both the effects of material disadvantage on health and the psychosocial impacts of a low socioeconomic position on health. When explored independently of educational attainment and income, occupational prestige – a purely perceptual measure – serves as a measure of the impact of a psychosocial phenomenon on health. For instance, a fire-fighter, academician or schoolteacher may carry the social benefits of a higher social status without actually having the income (in all cases) or the educational credentials (in the case of the fire-fighter) to match. We explored the independent influence of occupational prestige on mortality. We applied Cox proportional hazards models to a nationally representative sample of over 380,000 US workers who had worked at any time between 1986 and 1994 with mortality follow up through 2002. We found that occupational prestige is associated with a decrease in the risk of all-cause, cancer, cardiovascular and respiratory-related mortality after controlling for household income and educational attainment. We further investigated the question of whether the effects of prestige are moderated by sex and broader occupational groupings. Prestige effects operate in white-collar occupations for men only and within service occupations for all workers.

Keywords: socioeconomic position, social status, mortality, occupational prestige, US workers

Introduction

Socioeconomic position (SEP) is consistently found to be associated with health outcomes (Bartley *et al.* 1999a, Feinstein 1993, Geyer and Peter 2000, Geyer *et al.* 2006, Krieger *et al.* 1997, Link *et al.* 1993, Sacker *et al.* 2009, Williams 1990). In most epidemiological research, income or education level, or both, are used to measure SEP (Braveman *et al.* 2005, Winkleby *et al.* 1992) and there is some strong evidence that the associations between income or education and health are causal (Kawachi *et al.* 2010, Costello *et al.* 2003, Muennig 2008, Muennig *et al.* 2011). Income and education are indicators of access to material resources, such as safe housing, low-crime neighbourhoods or (in the case of the USA) health care. Health behaviour is particularly influenced by education, possibly in part because it imparts knowledge and in part because it places one in a lower risk peer group in social networks (Link and Phelan 1995, Muennig *et al.* 2009, Muennig *et al.* 2011). Income may be considered an indicator of material conditions that impacts on health (for example, Geyer *et al.* 2006) while education indicates social conditions that impact on health.

In addition to material pathways, there are hypothetical ways in which social aspects of low SEP can also influence health. For instance, those with a expensive car and house are afforded both a lifestyle associated with less stress and recognition of a higher social status by others. Using income and educational attainment as the only measures, it is difficult to make inferences about the influences of factors such as stress or prestige on health (Bartley *et al.* 1999a, Geyer and Peter 2000, Krieger *et al.* 1997). For example, university professors and fire-fighters tend to have high prestige in US society but do not have high incomes on average (Levitt and Dubner 2005). The social status conferred by high-prestige occupations is independently associated with physical health (Adler *et al.* 1994, 2000, Marmot 2004), psychological health (Link *et al.* 1993, Muntaner *et al.* 2004, Williams *et al.* 1992) and mortality (Lantz *et al.* 1998, Marmot *et al.* 1991, Muntaner *et al.* 2001).

However, this measure has not been studied in depth. For instance, we do not understand how it parses by gender or social class. We also do not even know the types of death that might be associated with low occupational prestige. This is important because, when measured independently of educational attainment and income, occupational prestige is a pure measure of the influence of psychosocial factors on health. Occupational status as measured here is also embedded in the cultural context. In this study, we seek to answer the question of how occupational prestige as a measure of social status impacts on mortality both independent of and relative to individual material status. We further probe this question by evaluating the conditions under which the psychosocial dimension has an effect, including biological sex and broad occupational conditions, as measured by homogenous groupings.

Based on our literature review, we found no peer-reviewed, published research focusing on social status as measured by occupational prestige or related measures (for example, the Duncan socioeconomic index [SEI]) as a predictor of mortality that is generalisable to the US population. The National Health Interview Survey (NHIS) with mortality follow up merged with occupational prestige scores as measured by the General Social Survey (GSS) provides an opportunity to estimate the unique effect of occupational prestige on mortality for the entire population of adult workers in the USA. The large sample size and adequate number of follow-up years also allow for estimates within sub-populations and for specific types of mortality.

SEP, health and mortality

The impact of SEP on health, morbidity and mortality has been frequently replicated in the literature (Adler and Ostrove 1999, Marmot 2004, Williams 1990). This relationship operates for a broad array of diseases across populations and for a variety of measures of SEP (Wong *et al*. 2002). The measurement of SEP varies across studies and is often measured by a single proxy that is interpreted as a measure of the multidimensional construct of socioeconomic position or class generally. Krieger *et al*. 1997 criticise this approach and argue for operationalising social class using multiple economic and social factors that vary as a result of class structure (including income, education and occupation characteristics). The multiple dimensions of SEP, though related, may have different degrees and mechanisms of effect on health depending on the particular health or mortality outcome under study and how the SEP variables are measured (Bartley *et al*. 1999a, Macintyre *et al*. 2003).

Occupational prestige is less commonly used as a measure of socioeconomic position than other measures like income, education and poverty (Krieger *et al*. 1997). Often, when occupational status measures are included, they are broad categorisations (for example, Hollingshead and Redlich 1958). But the more refined occupational status measures generally have stronger effects on health outcomes (Krieger *et al*. 2005) and show greater variability in health behaviour (Lee *et al*. 2007). Compared with higher occupational prestige workers, those of lower occupational prestige show significantly less resiliency with respect to changes in mental relative to physical health over time (Sacker *et al*. 2009). Occupational prestige may also be more reliable over the life span (Williams and Collins 1995). And, in some cases, occupational prestige has proved to be a superior predictor of morbidity and mortality (Geyer *et al*. 2006).

Several morbidity and mortality studies do include occupational status as a measure of SEP, particularly in the European health literature. The classic Whitehall studies on the relationship between occupational grade with health and mortality showed a strong linear effect of an individual's position in a government hierarchy and their health (Marmot *et al*. 1984, 1991). These studies evaluated the relationship among British civil servants using the British Registrar General's scale. This research group also estimated the relationship between occupation and health in two American samples, the Wisconsin longitudinal study (WLS) and the national survey of families and households and found similar gradients (Marmot *et al*. 1997). The WLS used an occupational status measure, the Duncan (1961) SEI, which is related to the occupational prestige measure utilised in this study on a USA sample. The WLS sample was limited in that it consisted of a single cohort of non-Hispanic whites who graduated from high school in 1957. However, this sample actually controls for economic differences, thereby supporting the notion of a social impact of prestige.

Alternative occupation measures are evaluated in European populations, for example, the Erikson–Goldthorpe schema has been adopted in Britain as a national measure of social class based on employment relations (such as employers versus employees) and conditions (such as service versus labour contracts where the former condition has more autonomy, job security and future career prospects) (Rose and O'Reilly 1997, 1998). The Erikson–Goldthorpe measure and others that focus on the social relations linked with the production of goods and services may be distinguished from others that locate a person on a continuum of status, where the former refers more to a concept of social class and the later to one of status (Muntaner *et al*. 2004). Occupational prestige, as measured in this study and used primarily in the USA, fits more firmly in the latter conceptualisation.

Social status effects on health have been found to differ for men and women. Using a theoretically derived measure of social position, Bartley (1999b) finds that social advantage is a more powerful predictor of health than employment conditions for women (Bartley *et al*. 1999b). Attachment to work has been found to differ for women, which may impact on the degree to which occupational prestige matters for them (Bielby 1992, Loscocco 1989). However, measures like that of Erikson–Goldthorpe seem to operate similarly for both men and women (Evans 1996). The effects of occupational prestige may also operate differently within similar occupational sectors or groupings defined by the Centers for Disease Control (CDC), which may control for a good portion of the heterogeneity in work environments.

Occupational prestige as a psychosocial measure of status

Occupational prestige is a quintessentially sociological construct, as measured in the GSS (Nakao and Treas 1992). Occupational prestige is measured by a consensus on prestige ratings among a representative sample of a population. Therefore, it refers to the collective belief about the 'social standing' or worthiness of a particular occupation for a specific culture and time period. It is probably best aligned with Weber's notion of status as one dimension among three (that is, class, power and status) that position individuals in a stratified society (Weber 1921). For Weber, status is determined by the social estimation of honour. This is distinct from purely economic, material or market situation, that is, class. However, Weber recognised the interconnection of class and status. For example, an individual's material wealth may imply status, but it is not necessary to be wealthy to have status.

With respect to health, Link and Phelan (1995) hypothesise that it is 'knowledge, money, power, prestige and beneficial social connections' that are the social cause of disease. People who garner social prestige are simply treated better than those who have less and, as a result, they have better access to the social resources that optimise survival. To the extent that this formulation is correct, it is important to consider the overlap between notions of social class and those of social status.

In this study, we evaluate the effect of the prestige score associated with an individual's occupational title on their mortality above and beyond that of the individual's education level and household income for the US population in the formal work sector. The residual effect of occupational prestige is interpreted as a psychosocial dimension of SEP that is composed of a cultural consensus on social power and position (MacKinnon and Langford 1994). The focus is on the differential impacts of the class and status dimensions of SEP on all-cause and cause-specific mortality. We further evaluate the relationship between prestige and mortality in four broad occupational groupings and also test whether gender moderates the relationship for the entire working population as well as within the occupational groupings.

Methods

Data and sample

The data are from the NHIS. The NHIS is a nationally representative, multi-purpose household survey of the civilian, non-institutionalised US population conducted annually. The NHIS data are obtained through personal interviews with household members, which are conducted each week throughout the year. The interviewing is performed by a permanent staff of interviewers employed by the USA Bureau of the Census. The NHIS annual samples are probability samples of households drawn using a stratified, multi-stage sampling design, which involves the selection of geographical units at the first stages, followed by selection of households and individuals (US Department of Health and Human Services 1989).

The analytic sample comprises 383,495 employed respondents aged 18 to 99 from the NHIS pooled over the years 1986 to 1994. This represents an estimated total population of 98,806,595 working American adults aged 18 and older (an annual average of approximately 11 million working Americans). The analytic sample consists of respondents who were employed either part time or full time in the two weeks prior to the respondent's NHIS interview date and who have an assigned US Census occupation category.

Analysis variables

Socioeconomic variables include occupational prestige, household income and education. Household income is the combined family income from the previous 12 months and is collected in 26 categories. Income was recoded as the median value of each category and rescaled in units of $1000. We use household income in order to control for both the income obtained through the respondent's occupation as well as their access to resources from other sources. Education is measured as the self-reported highest year of school completed.

Occupational prestige scores come from the 1989 GSS (Nakao and Treas 1994). In the GSS, 10 randomly selected subsamples from the 1500 respondents were selected. Each respondent was asked to evaluate 110 randomly ordered occupations based on a nine-point ladder of social standing (from 1 = lowest to 9 = highest). The same 40 occupations were rated by respondents from all 10 subsamples and an additional 70 occupations were rated by respondents from one of the subsamples. A total of 740 occupations were rated in the 1989 GSS. Prestige scores were calculated by taking a weighted mean score of the ratings for an occupation where the weights rescale the means to range from 0 to 100. Higher scores are given for higher perceived levels of occupational prestige. Because the GSS sample and subsamples are representative of the US population, the means are an unbiased estimate of the prestige evaluations for this population. Prestige scores were assigned to all 503 occupational categories detailed in the US Census of the Population (1980). The NHIS also includes the detailed 1980 US Census occupational categories; therefore, the prestige scores from the GSS were merged with the NHIS data based on the occupational classifications detailed. Table 1 displays the descriptive statistics for occupational prestige in the population distribution.

In some of the analyses, respondents were stratified into four occupational groupings, which are created by collapsing the 503 occupations into white-collar, blue-collar, service and farm groups. These occupational groupings follow the CDC sectors (Krieger *et al.* 2005). The white-collar group includes executive and administrative managerial; professional specialty; technicians/related support; sales; and administrative support occupations, including clerical. The blue-collar group includes precision production, craft and repair; machine operators, assemblers and inspectors; transportation/material moving; and handlers, equipment cleaners, helpers and labourers. The service group includes private household; protective

Table 1 *Occupational prestige score population distribution by sex and occupational sector*

	Sample (n)	*Population represented*	*Mean (S.E. mean)*	*25^{th} percentile*	*75^{th} percentile*
Total	383,495	98,806,595	43.73 (0.08)	32.10	50.60
Men	204,734	53,979,890	43.65 (0.09)	31.95	50.59
Women	178,761	44,826,705	43.82 (0.08)	32.32	50.62
White collar	226,981	58,818,707	49.91 (0.06)	42.23	59.06
Service	48,878	12,254,998	32.73 (0.08)	23.50	40.18
Farm	10,222	2,567,081	33.24 (0.20)	23.83	39.52
Blue collar	97,414	25,165,808	35.69 (0.05)	29.42	39.88

All mean contrasts for categories in sex and occupational sector are significant at $P < 0.01$.

Table 2 *Population (weighted) means and percentages for model variables (N = 383,495)*

Variable	*Mean*
Age in years	38.28 (0.06)
Household income in $1,000	40.71 (0.21)
Education level in years	13.22 (0.02)
	Percentage (SD)
Male sex	54.63 (0.11)
Ethnicity:	
White	86.57 (0.47)
Black	9.76 (0.37)
Other	3.67 (0.31)
Hispanic	7.14 (0.33)
Married	67.96 (0.24)

service; and service occupations, except protective/household. Finally, the farming group includes farming, forestry and fishing.

Socioeconomic control variables include age, sex, race, Hispanic ethnicity and marital status. Age is measured in years and is calculated from the self-reported birth date. Sex is based on interviewer observation and female is the reference category. Racial categories are self-reported and subsequently recoded into black, white (reference category) and other race. Self-reported Hispanic ethnicity includes Puerto Rican, Cuban, Mexican, Mexican–American, Chicano, other Latin American and other Spanish ancestry; non-Hispanic ethnicity is the reference category. Marital status is self-reported and collapsed into married and not married (never married, widowed, divorced, separated), with not married as the reference category. Table 2 presents population means and proportions for analysis variables.

The NHIS respondent data were linked to mortality data through to 2002 via the national death index. This linkage is performed using a weighted matching methodology based on personal identifiers and a number of items (such as name, social security number, birthday, state of birth and state of residence) (National Center for Health Statistics [NCHS] 2009). We used the public-use mortality file, which involves perturbations of either date or cause of death for a select sample of records as a protection against disclosure of participants. The perturbations do not affect results for all-cause or cause-specific mortality (Lochner *et al.* 2008). The underlying cause of death assignment is provided in the mortality file and was coded by the NCHS using the automated classification of medical entities system. The total number of deaths in this sample is 21,618 (35% from cancer, 32% from cardiovascular disease, 6% from respiratory related disease and 27% from other causes). In total, the 21,618 individuals who died represent 5.56% of the population.

Missing values

Respondents with missing values for any of the analysis variables were dropped from all analyses. A total of 61,418 respondents were dropped, representing 13.8% of the sample. Missing values were present for marital status (522 missing), income (60,251) and education (1752). Missing observations for income is the most problematic for this analysis since it is the primary source of missing data. The sample of observations with missing values on income has lower mean values for both education and prestige than the full sample: 12.6

versus 13.1 years of education and 41.3 versus 43.4 mean prestige score, respectively. This implies that observations missing on income are likely to be observations with lower incomes.

To test for selection effects due to missing data on income, the all-cause mortality model was also estimated for the entire sample of 444,913 respondents using direct maximum likelihood (ML) methods for missing data (Arbuckle 1996). Under this method, the assumption of missing at random conditioned on the covariates is required (Little and Rubin 2002). This means that knowing an observation's occupational prestige, education level and demographic characteristics (such as their age, sex, race, ethnicity and marital status) accounts for the relationship between income and mortality for the missing observations. Estimates for the model using all cases do not differ from the model with deleted cases except for the effect of the marital status control. Unfortunately, models using direct ML for missing data did not provide estimates for models with cause-specific mortality or models using smaller, stratified samples. Nevertheless, the nearly identical results across the two methods for the full sample support the assumption that selection effects due to missing data on income are minimal under the model.

Analyses

Cox proportional hazards models were estimated within a structural equation modelling framework. All models include the demographic controls and socioeconomic variables described in the previous section. The model is estimated for all-cause mortality, as well as cancer, cardiovascular and respiratory-specific mortalities.

In addition to the model estimation for the full sample, the all-cause mortality model is estimated separately for occupational group subsamples. For all models, the effects of occupational prestige on mortality were tested for sex moderation using an interaction, and non-linear relationships using prestige squared. Descriptive estimates were obtained from SUDAAN software v.10.0 (Research Triangle Institute 2008) and hazards model estimates were obtained from Mplus software v.5.2 (Muthén and Muthén 2007). Unless otherwise noted, all analyses are weighted and standard error estimates and test statistics are corrected for stratification and clustering.

Results

During the 1986–1994 study period, the average age of US workers was 38 years, the average annual household income was approximately $41,000 and the average number of years of education acquired was just over 13 (Table 2). The working population was 87% white and almost 10% black, with approximately 7% of Hispanic ethnicity and 68% who were married.

Occupational prestige does not deviate from normality significantly in terms of excess skew and kurtosis. The mean occupational prestige score for this population is 43.7 (Table 1). The average prestige score differs across sex and all occupational groups at a *P*-value less than 0.01. However, the substantive difference is not always large; for example, the average difference in prestige score between men and women is less than 0.2. Other differences are quite substantial; for example, between the white-collar group and all other occupational groups. As expected, the inter-quartile range reveals there is less variance in prestige scores within broad work groups than for the population as a whole. This is particularly true for blue-collar workers and to a lesser extent, farm workers.

Multivariable Cox regression model results for the full sample are displayed in Table 3. The effect of prestige was linear and there were no sex differences in the prestige effects.

Table 3 *Cox proportional hazards ratios for the effect of occupational prestige on mortality: the national health interview survey 1986–1994* (*N* = 383,495)

	All-cause		*Cancer*		*Cardiovascular*		*Respiratory*	
Independent variables	*HR*	*95% CI*	*HR*	*95% CI*	*HR*	*95% CI*	*HR*	*95% CI*
Age in years	1.08	(1.08, 1.08)	1.12	(1.12, 1.13)	1.10	(1.10, 1.11)	1.11	(1.10, 1.11)
Male sex	1.84	(1.78, 1.90)	1.28	(1.19, 1.37)	2.32	(2.19, 2.47)	1.68	(1.47, 1.92)
Ethnicity:								
Black	1.27	(1.21, 1.32)	1.23	(1.11, 1.37)	1.28	(1.18, 1.38)	0.70	(0.59, 0.83)
Other	0.94	(0.81, 1.09)	1.04	(0.83, 1.29)	0.87	(0.70, 1.08)	0.46	(0.26, 0.82)
Hispanic	1.04	(0.97, 1.12)	0.84	(0.71, 0.99)	0.94	(0.84, 1.06)	0.69	(0.53, 0.91)
Married	0.78	(0.76, 0.81)	1.05	(0.97, 1.14)	0.80	(0.76, 0.85)	0.67	(0.58, 0.77)
Household income in $10,000	0.95	(0.94, 0.95)	0.97	(0.95, 0.99)	0.94	(0.93, 0.95)	0.92	(0.89, 0.95)
Education level in years	0.97	(0.96, 0.98)	0.95	(0.94, 0.96)	0.97	(0.96, 0.98)	0.95	(0.93, 0.97)
Prestige score in 10 points	0.96	(0.95, 0.97)	0.96	(0.93, 0.99)	0.96	(0.94, 0.99)	0.89	(0.85, 0.94)

Higher occupational prestige decreases the hazard of death even when controlling for the alternative SEP measures of household income and education level (Table 3). An increase of 10 points in the prestige score translates into a 4% decrease in the hazard of death (hazard ratio [HR]: 0.96; 95% confidence interval: 0.95, 0.97) for the full population. Ten points on the prestige scale is a little over half of the population inter-quartile range (Table 1) and the HR effect can be compared to the fully standardised effect, which is 0.95 (0.93, 0.97). The effect of a 10-point increase in occupational prestige on mortality is greater than the effect of an additional year of education (0.97 [0.96, 0.98]) and less than the effect of an increase in the annual household income of $10,000 (0.95 [0.94, 0.95]). However, the effect of 10 points in occupational prestige is much lower than the effect of being married (0.78 [0.76, 081]), male (1.84 [1.78, 1.90]) and black (1.27 [1.21, 1.32]).

The results of the effects of occupational prestige on cancer mortality and cardiovascular-related mortality are comparable to the results for all-cause mortality (Table 3). Cancer and cardiovascular disease each represent about one-third of the total deaths in this population. Occupational prestige has a markedly stronger impact on the hazard of deaths due to respiratory-related disease, which makes up 6% of deaths in this population. A 10-point increase in occupation prestige lowers the hazard of respiratory death by 11% (Table 3).

The relationship between prestige and mortality was evaluated in each of the four broad occupational groups. The relationship was statistically significant only among white-collar and service workers (results depicted in Figures 1 and 2). Workers from these two groups make up over 70% of the working population in this sample. The model for both service and white-collar workers include a significant quadratic effect for prestige, indicating that the effects of prestige are curvilinear. In addition, the model estimated in the white-collar group had a statistically significant difference in the effect of prestige on mortality for men and women (the interaction term with prestige was $P < 0.01$ and with prestige squared was $P < 0.05$).

We present the effects of prestige on mortality for service workers and white-collar workers using survival functions because the interpretation of HRs for the quadratic prestige effects (plus for the sex by prestige interaction for white-collar workers) is not straightforward.

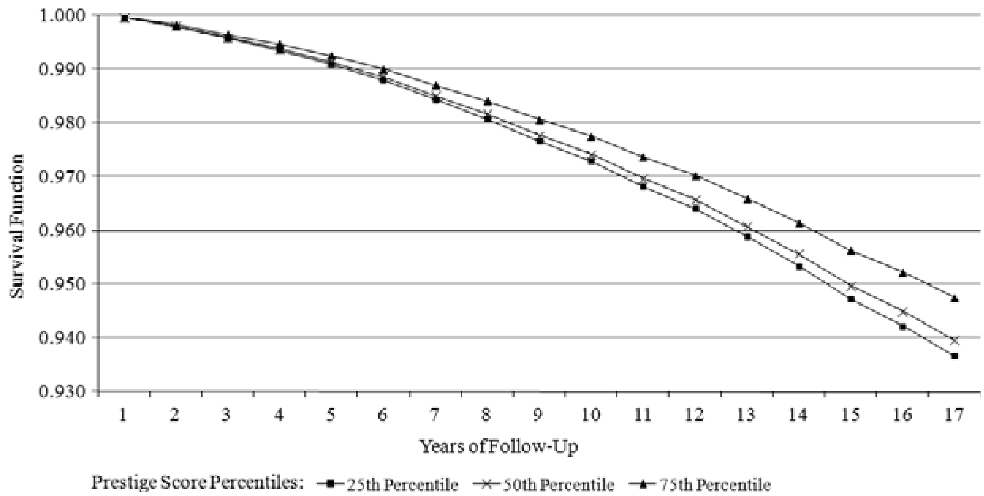

Figure 1 *Survival function by percentile rankings of occupational prestige for service sector workers*

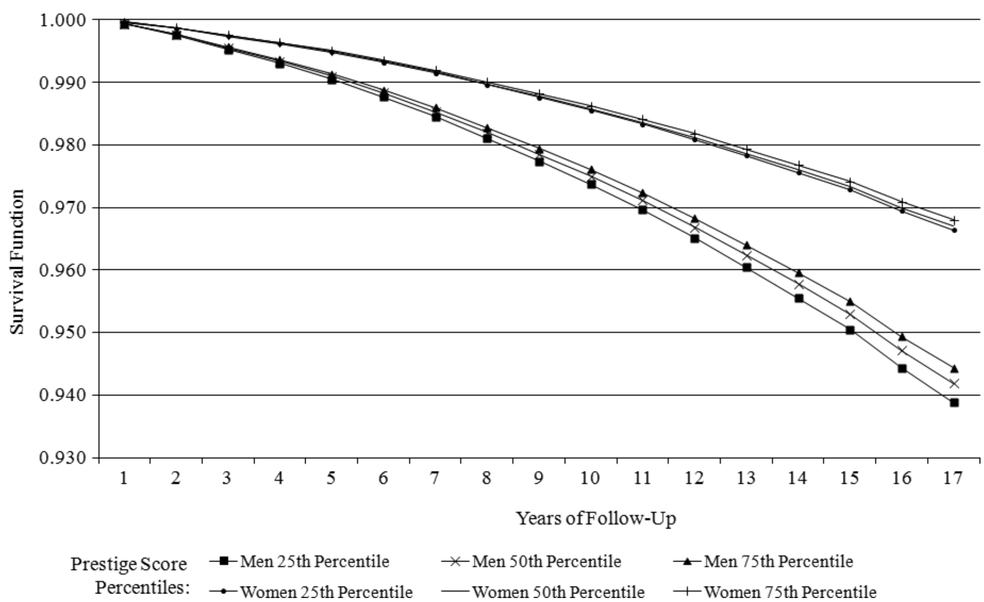

Figure 2 *Survival function by percentile rankings of occupational prestige and sex for white collar workers*

Figure 1 portrays the survival function across the 17 follow-up years for the average service worker population, which is 37 years old, 40% male, 17% black, 5% other race, 10% Hispanic, 56% married with an average household income of $29,500, an average education of 11.96 years and a median prestige score of 28. In Figure 1 the survival of service workers with a prestige score falling at the 25th percentile, 50th percentile and 75th percentile are compared across the 17 years of follow up. A service worker with a prestige score of 27.81 (the median prestige score among workers in this group) is 5% less likely to die than a service worker with a prestige score of 23.5 (25th percentile among workers in this group). A service worker with a prestige score at the 75th percentile (a score of 40.18) is 13% less likely to die than a worker with a median service worker group prestige score.

The survival function for the average white-collar worker is portrayed in Figure 2 for men and women separately. The population of white-collar workers is 39 years old, 8% black, 4% other race, 5% Hispanic, 69% married and has an average annual income of $46,000, an average education of 14.21 years and a median prestige score of 49. In Figure 2 it can be seen that there is a difference in the size of the effect of prestige on mortality when comparing sex, where the effect for men is larger. A typical male white-collar worker with a prestige score at the 75th percentile (59.06) is 10% less likely to die than male white-collar workers with a score at the 25th percentile (42.23) while the difference for the typical female white-collar worker in the same comparison is 5%. Nevertheless, the simple effects for women are statistically significant, even though they are smaller than the simple effects for the men. Like the service sector worker group effects, the effects for female white-collar workers are more pronounced at the higher levels of prestige, whereas for men the effects are similar across the range of occupational prestige rankings.

Discussion

There is an important and independent effect of occupational prestige on mortality hazard for the population of US adults in the years 1986 to 1994. The HR associated with a 10-point increase in occupational prestige score is 0.96 (0.95, 0.97). This effect is slightly less than the effect of $10,000 additional annual income and slightly greater than the effect for one additional year of education. Occupational prestige effects are more pronounced for service workers and for respiratory-related deaths. These results suggest that the socially defined status one holds in the occupational structure, unrelated to the economic resources of the occupation (income) and the health benefits of education, does impact on mortality.

High earning professions (for example, car dealership owners) can be generally associated with relatively low occupational prestige and high occupational prestige (for example, academics) can be associated with low earnings. We exploited this variation to explore the independent effect of occupational prestige on mortality by cause of death among various groups in the United States. Occupational prestige can impact on health by altering the levels of psychological stress one experiences (for example, because it is stressful to be seen as ‘low on the totem pole’). It may also work through its effect on beneficial social ties (for example, a poor academic with heart disease is much more likely to know a cardiothoracic surgeon than a butcher is). Stress has been linked to heart disease, infectious disease and other conditions leading to the disruption of the body’s normal homeostatic functions (McEwen 1998). Beneficial social connections also provide resources that reduce health risks, diseases and death (Link and Phelan 1995).

We believe that our estimates for the effects of occupational prestige on mortality may underestimate the strength of the association because we are limited to cross-sectional data that allow only a snapshot of occupation. The prestige score used is for the occupation that respondents held at the time they were interviewed, which is not necessarily the longest held occupation for many of the respondents (Gómez-Marín *et al.* 2005). Therefore, we are unable to take a life-course perspective that considers occupation over the entire career, including mobility and other transitions in occupations over time (Pavalko *et al.* 1993). It may be the case, for example, that older workers in our dataset are retired from their primary career. In fact, when we limited our all-cause mortality analysis to workers aged 30 to 60 (n = 255,663), we found that each of the SEP components had a stronger impact on mortality, yet with the same relative differences across the three components of SEP. The hazard of death decreases by 5, 4 and 6% for a 10 point increase in prestige score, a one year increase in education and a $10,000 increase in annual income, respectively. This analysis does not take into account individuals' career trajectories, but provides some evidence for the differential impact of SEP for those in the career phase of the life-course.

It is also possible that our estimates for the impact of occupational prestige and income are overestimated due to the healthy worker effect, which is a selection effect that can bias estimates due to sick individuals dropping out of the work force. This effect calls into question the causal direction of SEP and health association. Mulatu and Schooler (2002) tested the causal direction of the associations between an SEP composite of income, education and occupational status, and health status, using longitudinal data and structural equation modelling. They found that while there was some effect of health on SEP, the stronger pathway was from SEP to health status. In this analysis, we limit the selection problem somewhat by comparing mortality for individuals who are healthy enough to hold a job, but individuals may have lower prestige or jobs that are pay less than they would have been without career interruptions due to health issues. Again, a life-course evaluation of occupations over time would also help tease out the healthy worker effect.

This study makes a significant contribution in terms of applying a quintessentially sociological and cultural measure of status to the study of mortality. Occupational prestige measures a dimension of socioeconomic position that has been largely ignored in American health research and taps into a psychosocial dimension of SEP. Most other status measures used in research are composites that combine prestige with income and education, for example, the SEI (Duncan 1961). However, this study also exposes new questions that are not addressable using the NHIS. These questions include: (i) what are the specific mechanisms by which occupational prestige reduces the hazard of mortality, or is this psychosocial dimension a potential fundamental cause (Link and Phelan 1995, Phelan *et al.* 2004); and (ii) is occupational prestige possibly confounded with some other aspects of occupation, for example the occupational physical environment or associated material advantage that is the cause of mortality differences?

Several mechanisms have been suggested in the literature for the effect of SEP generally on health and mortality. Adler *et al.* (1994) outline two broad areas: health behaviour (such as smoking, physical activity and alcohol use) and psychological characteristics (such as depression, stress and hostility). We have argued here that occupational prestige, after controlling for education and income, taps into psychosocial mechanisms, though we do not test these mediators in our models.

Although not specific to occupation, status has also been theorised as a direct effect or fundamental cause of morbidity and mortality (Phelan *et al.* 2004). For example, dominance status or social ordering in a hierarchy has been found to affect health in many controlled experiments with animals (Sapolsky 1989, Sapolsky and Mott 1987). If occupational prestige, after controlling on social class, measures a purely psychosocial dimension, it seems that of all the components of SEP, the social dimension is closest aligned with the idea of social hierarchy. Social hierarchy could certainly affect health behaviour as well as mental health. For example, the effects for white-collar men may indicate that there is a psychological impact of relative status for men that may not operate as strongly for women. Even in the late 1980s and early 1990s, women's psychological health may not be as closely tied to occupational status as it is for men.

One might argue that the occupational prestige measure taps into the occupational environment, for example, the specific day-to-day tasks involved in a job or the level of autonomy and control workers have in their occupation, though these are likely to be indices of power. Much research has been devoted to contextual effects such as neighbourhoods and workplace that result from or are related to SEP. Liscomb *et al.* (2006) developed a conceptual model of work and health disparities that includes workplace exposure to physical, psychological and chemical hazards. Job strain, in particular, could be at play in terms of job insecurity, work–family conflicts and work shifts (Liscomb *et al.* 2006). Again, we argue that prestige is tapping into some of the psychosocial characteristics of jobs, but it may also pick up on physical contexts as well.

Some research has looked more in depth at the contextual characteristics of work, including social class and the workplace social environment. Borrell *et al.* (2004) evaluated social class effects on self-reported health. They measured social class using Eric Olin Wright's sociological definition, which includes the ownership of productive assets and control and authority in the workplace. They evaluated work organisation, household labour and material standards as potential mediators for the relationship between social class and self-reported health. Their findings were that for men, work organisation and (to a lesser extent) material standards explained these effects, while for women hours of household labour were an additional mediator that resulted in their lower health ratings.

There also may be specific occupational characteristics that are related to occupational prestige and that largely account for the relationship (Marmot 2004). For example, the high impact of occupational prestige on respiratory deaths may be a factor of difference in the work environment where higher prestige positions are also positions that have healthier work environments from the point of view of respiratory health (Lipscomb *et al.* 2006). Our analyses in the broadly defined occupational groupings partially control for those effects, but a more precise assessment of these factors is necessary before the possible direct effect of prestige on health can be accepted.

Address for correspondence: Sharon L. Christ, Child Development & Family Studies/Statistics, Purdue University, 101 Gates Road, West Lafayette, Indiana 47906, United States
e-mail: slchrist@purdue.edu

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