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The Impact of Worker Displacement on Health: The Role of Economic Conditions, Education, and Age at Displacement

Abstract

Over the past 30 years in the United States, the practice by companies of laying off workers to cut costs and improve profitability has become commonplace. These former employees frequently experience a period of unemployment before accepting a job with lower wages than provided by their former employer. They are also less likely to have health insurance than before. Unemployment, income level and health insurance status have all been found to impact health outcomes. This paper will specifically examine the impact of worker displacement on health in the United States. In addition, the paper will explore three topics that have not been previously researched in this area, the extent to which the impact of displacement on health varies according to 1) economic conditions in the year of displacement, 2) worker age at the time of displacement, 3) displaced worker education level. Findings from ordered probit and fixed effects models suggest that the negative impact of displacement on health is restricted to displaced workers with a college degree as well as those who are displaced when the unemployment rate is greater than 6.0 or who are displaced at ages 62 and older.

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Background and Literature

Over the past 30 years there has been a transformation in the nature of the relationship between employers (e.g. firms, companies, and organizations) and employees in the United States. From 1945 until the mid 1970s the employer-employee relationship was characterized by commitment on the part of the employer and longevity on the part of the employee. Governmental policies put into place during this time period reflected the commitment on the part of the American people, politicians and business leaders to job security. This however changed in the late 1970s. Due to increasing foreign competition combined with improved transportation and communications infrastructure that allowed multinational corporations to employ cheaper foreign labor overseas, firms began to institute the process of cutting their American workforces to compete in the global economy (Uchitelle 2006). Over the next 30 years, the power of labor unions declined and the use of layoffs as mechanism to increase profitability became commonplace.

This broad shift in labor practices may have improved the competitiveness of American and multinational firms, but it did not come without costs to the American workforce. A wide body of research has shown that the individuals who lose their jobs (frequently referred to as displaced workers) frequently experience a prolonged period of employment after which they are forced to accept positions that typically offer less pay than their prior position, may have less job security and promotion potential and frequently do not provide health insurance or other benefits. (Brand 2006, Farber 2003, Fallick 1996, Keltzer 1998). Not surprisingly, economic conditions impact the outcomes for displaced workers. Workers who are displaced during periods of high unemployment are more likely to remain unemployed for a longer period of time (Office of the President 2008) and are less likely to recover their pre-displacement wages (Wachter, Song and Manchester 2009).

The probability of being displaced is not consistent across the U.S. labor force; those without a college degree and older workers are disproportionately likely to experience job displacement (Koeber and Wright 2001). Furthermore, employment and earnings outcomes following displacement also vary according to the age, educational attainment and race of the displaced worker, although the findings are not entirely consistent. Perhaps the strongest finding is that workers with lower levels of education have worse outcomes following displacement. Similar patterns have been found when comparing those who did not complete high school to those with a high school diploma; and those with only a high school diploma to those with a college degree. Displaced workers with lower levels of education have tended to experience a longer duration of unemployment and a greater drop in wages following displacement (Farber 2003, Helwig 2004, Hammermesh 1989)[1]. However, Koeber and Wright (2001) found no relationship between having a college degree and earnings change following displacement. In terms of race and/or ethnicity, Farber (2003), Lippman and Rosenthal (2008) (both controlling for educational attainment), and Hammermesh (1989) found that non-white and/or black displaced workers experienced longer unemployment spells or were less likely to be re-employed following displacement. Helwig (2004) also found that black displaced workers suffered a greater loss of income. However a few other studies found no impact of race or ethnicity on earnings change following displacement, once educational differences were taken into account (Koeber and Wright 2001, Lippman and Rosenthal 2008, Farber 2003).

Research strongly suggests that displaced workers over age 55 are the least likely to become re-employed, although this may be related to decisions to retire (Farber 2003). However there seems little evidence that there is an impact of age on duration of unemployment for displaced workers under age 55 (Farber 2003). In terms of income change, some studies have focused specifically upon displacements above age 50, and have found that such workers experience a greater drop in earnings following displacements as compared to younger workers (Koeber and Wright 2001, Jacobson, Lalonde and Sullivan 1993, Hammersmith 1989). Farber (2003) confirms that workers aged 55-64 do suffer the largest

[1] Most of the research on earnings change following displacement appears to be restricted to individuals who have found a new job as to not confound with the impact of unemployment (Helwig 2004, Farber 2003, Koeber and Wright 2001).

drops in earnings, at least for some calendar years. However other studies suggest that the relationship between age at displacement and post-displacement outcomes may be non-linear, with displacements between age 40-55 having worse consequences in terms of earnings change than displacements at both older and younger ages, at least for some calendar years between 1981-2001 (Farber 2003, Helwig 2004). A handful of older studies found no impact of age at displacement on the drop in earnings following displacement, but this may have resulted from an attempt to capture the relationship between age and post displacement outcomes in a linear fashion (Hamermesh 1989).

Three inter-related outcomes that frequently follow displacement: the experience of unemployment, including the stress of looking for work and the feelings of shame often associated with being out of work, a permanent loss of income, and loss of health insurance have all been found to have negative consequences for physical health (Pappas 1993 et al, Williams and Collins 1995, McWilliams et al 2007, Baker et al 2002, Baker et al 2001, Dor, Sudano and Baker 2006, Dooley, Fielding and Levy 1996 and Jin, Sha and Svoboda 1995, Uchitelle 2006, and Newman 1988). Not surprisingly then, there is a growing body of research on the impact of involuntary job loss on health outcomes in the United States.

Involuntary Job Loss in the United States and Health

Several recent studies have data from the Health and Retirement Survey between 1992 and 2002 to examine the impact of job loss on health outcomes in the United States. After controlling for baseline health, researchers found that respondents who experienced an involuntary job loss between the initial and follow-up interview were more likely to suffer from myocardial infection and stroke and to report physical limitations (e.g. difficulty with walking, climbing stairs) relative to individuals who had not suffered a job loss (Gallo et al 2006, Gallo et al 2004, Gallo et al 2000)[2]. While these studies make valuable contributions to our understanding of the impact of job loss on health, they are limited in that the samples include only respondents who were at least age 50 in 1992. Therefore, the research focuses exclusively on job loss that occurs relatively late in the respondents' employment careers. As I will discuss in more detail the subsequent section, various factors may result in displacement at older ages having either a greater or lesser impact on health. For instance, older workers may have more difficulty finding a new job, but they may also be more likely to have savings or other resources which can cushion the economic blow of displacement.

A handful of studies have examined the impact on health of job loss on health in the United States while focusing on at a wider range of ages. An early study of worker displacement in southeast Michigan was based on a 1984 survey of households. Respondents were asked about spells of unemployment for up to 5 years before the survey date. The authors used the following criteria to determine which job losses were exogenous, that is resulting entirely from economic conditions facing the employer and not related to any personal characteristics of the displaced worker: whether the company closed entirely at the time of the displacement, the number of other employees who were displaced at the same time, and self-reports by respondents regarding whether they believed their own behavior or performance was in any way related to the displacement. The authors found that a spell of 'no-fault' unemployment in the past five years was associated with worse self-rated physical health at the time of the survey (Kessler, House and Turner 1987).

More recently, Strully (2009), used data from the Panel Study of Income Dynamics from 1999-2003 to examine the impact of job loss over the previous two years on self-rated health as well as the probability of developing (since the prior survey) at least one of a series of health conditions including heart disease, hypertension, diabetes and arthritis. For models estimating self-rated health, self-rated health in the prior wave was included as a covariate. Strully (2009) also distinguished between what she considers to be 'no fault' or exogenous spells of unemployment and unemployment that may potentially be related to characteristics of the employee. Only cases where an entire company, plant or office was

[2] Hazard models were used to estimate the 'transition' to stroke or myocardial infection; therefore the job loss preceded the illness temporally.

shut down or relocated were classified as 'no fault' job losses. The PSID does not distinguish between job losses due to downsizing/layoffs and discharge/firing. Strully (2009) included this joint category and classified it as an endogenous source of displacement vis a vis employee health.

Strully (2009) found that 'no fault' job loss was significantly associated with both self-rated health as well as the likelihood of developing at least one of the conditions described above. However, the impact of a 'no fault' job loss on self-rated health was only significant at the $p < .1$ level. Strully (2009) noted that because the 'no fault' job loss category only included cases where the workplace closed entirely, the number of job losses falling into this category was small (<300). Therefore she felt that it was appropriate to report significant levels between .05 and < .1. It should be noted that family income was included as an additional covariate in the models. Therefore the model estimates the impact of job loss on health net of the impact of income. However, a loss of in income that persists even after finding new employment is one of the mechanisms by which job loss may impact health. Therefore the 'total' effect of displacement was likely larger than what was reported.

The most comprehensive study of the impact of worker displacement on health in the United States was conducted by Burgard, Brand and House (2007). Using data from the Wisconsin Longitudinal Survey (WLS) from 1975-1992, they explored the impacts of involuntary jobs loss on self-rated health for up to 17 years following the job loss. The WLS is a survey of a sample of individuals who graduated from Wisconsin high schools in 1957. Respondents were approximately 53 when health was assessed; displacements from age 36-53 were captured by the survey. Burgard, Brand and House distinguished between types of involuntary job loss such as being fired, leaving a job for health reasons and job loss considered to be exogenous to the characteristics of the employee. Burgard, Brand and House (2007) considered job loss due to plant closings and company relocations, and downsizing (e.g. layoffs) to produce 'no-fault' or exogenous job loss, which they termed 'displacement'. They found that the impact of displacement on self-rated health was small but statistically significant. The long time frame of the study allowed the researchers to capture the full array of mechanisms by which displacement impacts health: the initial period of unemployment, a lasting decrease in wages and possibly an extended period without health insurance.

I will replicate the research of Burgard, Brand and House (2007), with some relatively minor adjustments to the model, using the same data source but extending the research through 2004. However, I will also examine the extent to which three factors moderate the impact of worker displacement on health outcomes: economic conditions at the time of displacement, educational attainment of the displaced workers, and age at displacement. One might expect that displacement that occurs when the unemployment rate is high would have more serious consequences for health outcomes, as workers displaced in a recession tend to be out of work longer and to have more difficulty recovering their earlier wages when they do find work. Research to date has not directly addressed the extent to which economic conditions moderate the relationship between displacement and health. However related research in Sweeden and Finland has suggested a higher unemployment rate is associated with a greater risk of mortality for the population overall (Gerdhtham and Johannesson 2005, Hemstrom 1999), that this effect is more pronounced among the long-term unemployed (Blomgren and Valkonen 2007) and that the relationship between employment status and self-rated health is stronger in periods of high unemployment (Ahs and Westerling 2005).

As I have discussed, the literature suggests that race/ethnicity, age, educational attainment tend to moderate the impact of displacement on earnings loss and possibly on duration of unemployment. Therefore one might expect that displaced workers who have less education, are non-white or are displaced at older ages might also experience worse consequences in terms of their health. Because the oldest displaced workers (e.g. over age 60) may have more savings and will soon be eligible for Medicare, the moderating impact of age may not be linear. While some studies have focused specifically on health outcomes due to involuntary job loss at specific ages (e.g. Gallo et al 2006, Gallo et al 2000), prior research has not examined how the impact of worker displacement on health might vary depending on the age at displacement. I am not aware of any studies that have examined the extent to which the

impact of displacement on physical health varies according to education level. Because the respondents for the data source I will use: the Wisconsin Longitudinal Survey, are nearly all white, I will not be able to examine race/ethnicity as a moderating factor.

Summary of Research Questions

To summarize and reiterate, this project aims to answer four primary research questions:

1) Do displaced workers have worse self-rated physical health outcomes than individuals who have not experienced displacement[3]?

2) Is this impact moderated by the unemployment rate in the year in which the employee was displaced.

3) Is this impact moderated by the age at which the employee was displaced?

4) Is this impact moderated by the displaced worker's level of educational attainment, e.g. no high school diploma, high school diploma but no college degree, bachelors degree or higher.

Data Source: Wisconsin Longitudinal Study

This project will use The Wisconsin Longitudinal Study (WLS). This public use survey includes detailed employment histories for the respondents, including the reason they left each job as well as measures of self-rated health. The survey also includes a set of covariates which may impact both the likelihood of displacement and health outcomes. Therefore the survey meets the basic criteria needed to answer the key research questions of this project. In fact, The Wisconsin Longitudinal Survey is the only survey which includes measures of health at multiple points in time and includes long-term detailed employment histories which distinguish worker displacement (involuntary job loss that is not related to the employee's ability or job performance) from other types of involuntary job loss. The Wisconsin Longitudinal Study began in 1957 with a questionnaire distributed to all high school seniors in the state of Wisconsin in 1957 (10,317 individuals) over time. These respondents' parents were interviewed in 1964, and the respondents themselves were interviewed by telephone, through a personal interview or both in 1975, 1992-3 and 2004. Health was measured in 1992-3 and 2004 so I will have a panel of two time periods. Employment history was measured from 1975-2004, so I use information on involuntary job losses that occurred within that time[4]. **add back in information on response rates**

[3] The survey does capture multiple displacements. As currently conceptualized this project does not consider multiple displacements as a distinct category although this would be an interesting idea to explore for future research.

[4] It can be argued that displacements prior to 1975 were relatively rare as compared to the period from 1975 to the present.

Table 1: Variables Used in Analysis

Variable	WLS Description
Health Outcome	self-rated health 5 point scale: very poor, poor, fair, good, excellent
Work Displacement	
Experienced Displacement	displaced since age 36
Economic Conditions in year of Displacement	United States unemployment rate is greater than 6.0 in the year of displacement.
Age at Displacement	Age 50-55, age 56-61, age 62+
Years Since Displacement[5]	3 year increments: 0-3, 4-6, 7-9, 10-12, 13-15, 15+
Other Types of Involuntary Job Loss	Retirement displacement, fired, temporary/seasonal layoff, business failure, health reasons
Demographic Controls	
Age	(54 or 65)
Sex	male/female
Race/Ethnicity	not available
Nationality	not available
Marital Status	married, never been married, widowed/divorced/separated
Educational Attainment	high school diploma, some college, bachelors degree or higher
Family Background	
Parents SES Factor Score	Index from factor analysis including mother's education, father's education, father's occupation and household income at age 18. Factor analysis was conducted by WLS staff.
Employment Context Associated with Displacement and Health	
Industry	whether the respondent has ever been employed in manufacturing, mining and construction
Occupation	whether the respondent has ever been employed in each of the following eight occupational groups: professional/technical, managerial, administrative, sales, service, skilled worker/operator/laborer, farmer, military
Income	earnings at age 36 (1975).
Interaction Terms	
Education with experienced displacement	bachelors degree*displacement
Education with experienced displacement	some college*displacement

Coding Worker Displacement

My key independent variable will be whether the respondent has ever been displaced from a job. I am defining worker displacement as the involuntary loss of a job that is not related to the work-related

[5] This variable is included because displacements at older ages are also more recent displacements. Therefore it is important to control for any impact of duration since displacement.

characteristics, skills or behavior of the employee. Worker displacement is instead due to the employing company or organization experiencing some sort of economic/financial situation that leads them to want to increase profitability/save costs by cutting their labor force, or in the extreme case leads to a decision to close the firm, plant or organization entirely. The WLS collected complete employment histories from 1975-2004 and asked the respondents why they left each job. The term 'left' here incorporates both voluntary job loss (e.g. quitting) and involuntary job loss. The following response options for why an individual left a job will be the primary indicators of worker displacement: 'business closing, downsizing or relocating', 'business changed: owners; bought out, relocated or sold' and 'company re-organization meant moving'. I have distinguished between displacements related to retirement from regular displacements, as the former may include a benefits package (such as a pension) which would alleviate the impact on health. I will also include variables to control for the impact of other types of involuntary job loss including being fired, leaving a job for health reasons and losing one's own business (listed as business failure). Because loss of a temporary or seasonal job is a different experience from being displaced from a long term position, I have included a separate variable for involuntary loss of temporary/seasonal jobs.

Economic Conditions

I include a variable to measure the United States unemployment rate in the year of displacement. I would have liked to use a variable measuring the unemployment rate in the state or metropolitan area where the respondent resided at the time of displacement. However, geographic information on respondents is not provided in the public use WLS data set. Over the 30 years for which employment histories were collected (1975-2005), the United States unemployment rate varied from approximately 4.0 to 10.0. The variable will indicate whether the respondent was displaced in a year in which the United States unemployment rate was greater than or equal to 6.0. I also experimented with using a linear variable to capture the actual unemployment rate, but the dummy variable was stronger and more consistently significant across the models I will discuss in the results section. I also explored using two variables: one for an unemployment rate of 6.0-8.0 and one for an unemployment rate above 8.0. However the coefficients for the two variables were nearly identical so I chose to simply use one variable[6].

Distinguishing Between Age at Displacement and Time Since Displacement

Using the WLS to distinguish between the impact of the age at displacement and the impact of the time since displacement is somewhat complex. This is because all members of the survey graduated from high school in the same year, and so the great majority of respondents were born in the same calendar year. With a single year of outcome data, it is therefore impossible to conceptually distinguish between the impact of age at displacement and time since displacement as these would be completely mutually determined. However, since there are outcome data on health at two time periods (1992-3 and 2004), I can make use of the panel nature of the data set to distinguish between these two effects. The table below shows the overlap and distinction between the two sets of categorical variables for the WLS[7]. The rows show age at displacement and the columns show years since displacement. The cells show the year of data collection which capture each age at displacement/time since displacement combination. We see that each period of time since displacement includes multiple ages at displacement and vice versa. This allows us to distinguish the impact of age at displacement from the impact of time since displacement

[6] This variable has a value of 0 for respondents who have not been displaced. Therefore it is an interaction term.

[7] Age in this table is an approximation assuming the respondents were born in 1939, which is true for more than 75% of respondents.

Table 3: Age at Displacement and Time since Displacement for WLS Respondents

	0-3 years	4-6 years	7-9 years	10-12 years	13-15 years	15+ years
Age 36-49			1992-3	1992-3	1992-3	1992-3, 2004
Age 50-55	1992-3	1992-3		2004	2004	
Age 56-61		2004	2004			
Age 62-65	2004					

Additional Covariates

I also include in the models a set of standard covariates used in models to estimate health outcomes (gender, age, education level, marital status, family economic background), as well as several variables often included in models used to estimate the probability of displacement that also may impact health, such pre-displacement earnings, experience in the manufacturing, mining and construction industries (which have particularly high displacement rates and may expose workers to health risks due to hazardous chemicals and other physical risks) as well as full set of controls for experience the standard set of occupational classifications.

Sample

Following Burgard, Brand and House (2007), respondents were included in the analysis if they answered the question about self-rated health and provided a valid response to the question 'Why did you leave this job' for each employer spell prior to the respondent's current job, if currently employed. A small number of respondents were missing data on covariates other than income (80) and were excluded from analysis. The final sample with complete data for all the covariates was 11542 observations. Income was missing for approximately 10% of the sample in 1975, 1992-3 and 2004. I therefore used multiple imputation methods to estimate income for each year.

Results: Descriptive Statistics

Table 2 presents a summary of the variables used. We see that displacement is a relatively common occurrence (17% of the sample has experienced displacement). Displacements are fairly evenly dispersed over time although slightly more displacements occurred in the years just before the surveys were administered (1990-1993 and 2001-2004). This is not surprising as those were recession years). Approximately half of the sample is male. This is a fairly well educated sample relative to the general U.S. population born in 1939; one quarter of the sample have at least a bachelor's degree and an additional 14% have at least some college. Not surprisingly then there is strong representation in white collar occupations with nearly a third of the sample having work experience in professional/technical managerial and administrative/clerical positions. Blue collar occupations are also represented; nearly 30% of the sample has been employed in craft, operator or laborer positions. The average respondent income of $33,447 is somewhat below the national average for 2004.

Table 2: Summary of Variables Used in Analysis

Variables	Mean/Percentage of Sample	Standard Deviation
Health	4.09	.67
Experienced Displacement	16.6%	
Displaced and unemployment rate > 6.0	11.4%	
Displaced 0-3 years ago	3.2%	
Displaced 4-6 years ago	2.4%	
Displaced 7-9 years ago	2.4%	
Displaced 10-12 years ago	2.3%	
Displaced 13-15 years ago	2.2%	
Displaced 15 or more years ago	4.3%	
Displaced at ages 50-55	4.6%	
Displaced at ages 56-61	2.4%	
Displaced over age 62	1.2%	
Displaced and Some College	2.3%	
Displaced and Bachelors Degree or higher	3.1%	
Retirement Displacement	2.1%	
Business Failure	0.6%	
Temporary/Seasonal Job Loss	3.0%	
Fired or Discharged	5.1%	
Left Job for Health Reasons	7.3%	
Year is 1992-3 (age is approximately 54)	52..3%	
Male	47.2%	
Never Been Married	4.1%	
Widowed/Divorced Separated	14.9%	
Some College	13.5%	
Bachelors Degree or Higher	25.8%	
Earnings in 1975 (in 2004 dollars)	$33,447	$36,810
Parents SES 1957 (factor score from 1-97)	16.3	11.2
Ever employed in Manufacturing, Mining or Construction Industries	35.6%	
Ever employed in the following occupation:		
Professional/Technical	31.6%	
Executive/Managerial	28.6%	
Administrative/Clerical	31.1%	
Sales	20.7%	
Skilled Craft, Operator or Laborer	27.9%	
Service	15.4%	
Military	0.1%	
Farming	5.0%	
N = 11566 (for 1975 income, N = 10432)		

Multivariate Analysis:

To estimate the impact of displacement on self-rated health and examine the moderating impact of unemployment rate, education level and age at displacement, I estimated two sets of models. The first set of models were estimated using ordered probit techniques. The second set of models were estimated using fixed effects in order to provide a stronger control for unobserved characteristics that might simultaneously influence displacement and health.

Ordered Probit Models

I began by estimating a series of five ordered probit models to estimate the impact of displacement on health. The first ordered probit model included a variable for whether the respondent had been displaced as well as the full set of demographic, family background, and employment context controls as wll as the other types of involuntary job loss described in Table 2. Additional ordered probit models added interaction terms to assess the moderating effects of the unemployment rate is greater than 6.0 (model 2), age of displacement (model 3), educational attainment of the displaced worker (model 4) and all moderating effects (model 5). Because the WLS includes repeated measures for the same respondents at two time periods (1992-3 and 2004), ordered probit models which take into account the panel structure of the data are appropriate.

The ordered probit model for panel data can be represented as follows:
$Y_{ti}^* = X_{ti}\beta + \mu_i + \varepsilon_{ti}$

where:
Y_{ti}^* is a continuous latent index for self-rated health
X_{ti} includes the variables shown for each respective model
μ_i is the portion of the error specific to the individual which does not vary over time
ε_{ti} is the time variant portion of the error term
'i' represents the individual respondent
't' represents time: either 1992-3 or 2004

The corresponding observed Y_{ti} is the ordered scale shown in Table 2 with 5 = 'excellent health' and 1 = ' very poor health'. We observe:
$Y_{ti} = 1$ if $Y_{ti}^* < \tau_1$
$Y_{ti} = 2$ if $\tau_1 < Y_{ti}^* < \tau_2$
$Y_{ti} = 3$ if $\tau_2 < Y_{ti}^* < \tau_3$
$Y_{ti} = 4$ if $\tau_3 < Y_{ti}^* < \tau_4$
$Y_{ti} = 5$ if $\tau_4 < Y_{ti}^*$

where τ_1, τ_2, τ_3 and τ_4 are thresholds estimated by the model.[8]

Because the WLS data include repeated measures of the same individuals over time, the error term for models using these data has two components, μ_i and ε_{ti}. Due to the presence of μ_i, the composite error term is correlated within respondents over time. As a result, although ordinary ordered probit models will produce unbiased and consistent estimates of the coefficients, the standard errors for these coefficients will be incorrect (downwardly biased). Therefore I used robust standard errors which adjust for correlated errors within respondents. Using this technique with panel data produces unbiased consistent coefficient estimates with correct standard errors (Greene 2003, Hisao 2003).

Results from the initial ordered probit model are presented in Table 3. Model 1 includes displacement and the additional types of job loss and the set of covariates presented described in Table 1. We see from Model 1 that the standard covariates are statistically significant and in the expected directions. Being younger (approximately 54 as opposed to 65), female, married and having additional education beyond high school are all associated with a higher probability of being in 'better health'. In addition, higher earnings in 1975 and growing up in a family with higher SES are associated with a higher probability of being in 'better health'. Working in manufacturing, mining and construction are associated

[8]. STATA version 11 was used to estimate these and all other models. For identification purposes, STATA does not assign an intercept to the model but estimates all thresholds (also called cutpoints).

with a lower probability of being in 'better health', whereas some occupations (professional/technical, managerial and administrative) serve as a protective factor vis a vis health.

Not surprisingly, experiencing a temporary or seasonal job loss and leaving a job for health reasons are significantly associated with a lower probability of being in 'better health'. The coefficients for business failure and a retirement displacement are negative, although of these coefficients are not statistically significant. In regards to the impact of business failure, the number of business failures is very low (< 65). Therefore, I think the model lacks adequate power to accurately assess the impact of business failure. In terms of retirement displacement, it is important to note that only 88 respondents experienced retirement displacement who did not also experience regular displacement. Therefore similar to business failure, it is likely that the model does not have the power to determine the specific impact of retirement displacement. Finally, we see from Model 1 that the coefficient for displacement is statistically significant and negative. Therefore, experiencing displacement is significantly associated with a lower probability of being in 'better health'.

Table 3: Impact on Self-Rated Health: Ordered Probit Initial Model

	Ordered Probit Model 1	
Displaced	-0.079*	(0.034)
Retirement Displacement	-0.071	(0.071)
Temp/Seas Job Loss	-0.157*	(0.061)
Fired/Discharged	-0.054	(0.055)
Left job for health reason	-0.891***	(0.051)
Business Failure	-0.023	(0.164)
Year is 1993 (age is approximately 54)	0.171***	(0.018)
Bachelors Degree or more	0.296***	(0.039)
Some College	0.122***	(0.040)
(reference group: no college education)		
Widowed/Divorced/Separated	-0.116***	(0.035)
Never Been Married	-0.332***	(0.064)
(reference group: currently married)		
Earnings 1975 ($1,000)	0.002***	(0.000)
Parents SES 1957	0.005***	(0.001)
Male	-0.152***	(0.036)
Ever employed in the following industries/occupations:		
Manufacturing/Mining/Construction	-0.116***	(0.031)
Professional/Technical	0.112***	(0.033)
Executive/Managerial	0.091**	(0.030)
Military	0.503	(0.332)
Farming	-0.006	(0.053)
Service	-0.013	(0.036)
Administrative/Clerical	0.104***	(0.031)
Sales	0.086**	(0.033)
Craft/Operator/Laborer	0.016	(0.035)
N = 11566 * p <= .05 ** p <= .01 *** p <= .001 + p < .1		

As has been noted, additional ordered probit models add interaction terms to assess the moderating effects of economic context, age and education level, The key results from ordered probit models models 1-5 are presented in table 4 below. The magnitude and size of the coefficients for the

additional covariates are nearly indistinguishable among models 1-5. Therefore I have not presented these coefficients in table 4. These results are available upon request.

Table 4: Impact on Self-Rated Health: Ordered Probit Models

	Model 1		Model 2		Model 3		Model 4		Model 5	
Displaced	-0.079*	(0.034)	0.014	(0.056)	0.027	(0.086)	0.070	(0.061)	0.108	(0.066)
Displ & UR > =6			-0.132*	(0.064)	-0.150+	(0.080)	-0.133*	(0.064)	-0.167*	(0.066)
Displ < 3 years ago									0.055	(0.081)
Displ age 50-55					0.038	(0.071)				
Displ age 56-61					0.038	(0.102)				
Displ age 62+					-0.263*	(0.114)			-0.349**	(0.119)
Displ & BA							-0.188*	(0.084)	-0.202*	(0.084)
Displ & some coll							-0.144	(0.097)	-0.150	(0.097)

N == 11566 * p < .05 ** p < .01 + p < .1

Model 2 adds an interaction term indicating that the respondent was displaced in a year in which the United States unemployment rate was greater than or equal to 6.0. We see from Table 10 that being displaced in a year when the United States unemployment rate was above 6.0 has a negative impact on the probability of being in 'better health'. In Model 2, the main effect estimates the impact on the probability of being in 'better health' of being displaced in a year when the United States unemployment rate was less than 6.0. Interestingly, the main effect for displacement in Model 2 is very small and is not statistically significant. This suggests that the negative impact of displacement is restricted to respondents displaced in a year when the U.S. unemployment rate is above 6.0. Due to the apparent significance of economic conditions in the year of displacement, the interaction term for unemployment rate in the year of displacement was included in all subsequent models.

Model 3 adds interaction terms to assess the extent to which the impact of displacement on health varies according to age at displacement. The reference category is experiencing a displacement under age 50. The main effect of displacement in this model is the impact of experiencing a displacement 1) under age 50 and 2) in a year when the annual United States unemployment rate was < 6.0. The interaction term for experiencing displacement at ages 62 and over is negative and statistically significant suggesting that experiencing a displacement at ages 62 and older is harmful for one's health even in times of low unemployment, although it will be even more harmful in times of greater unemployment. The coefficients for displacements at ages 50-55 and 56-61 are not significant suggesting that the impact of displacement at these ages does not differ from the impact of displacements occurring below age 50.

Model 4 includes interaction terms to assess the extent to which the impact of displacement on health varies according to the education level of the respondent. The reference category is experiencing a displacement and having no college education. The main effect of displacement is experiencing a displacement 1) for respondents who have no college education with 2) in a year when the annual United States unemployment rate was < 6.0. In Model 4 we find that the interaction term between displacement and having at least a bachelor's degree is negative and statistically significant, suggesting that the negative impact of displacement on health is *stronger* for respondents with the most education. The interaction term for displacement and having some college education is not statistically significant. However, there are not many respondents in the displaced and some college education category (n = 263), therefore the model has minimal statistical power vis a vis this group.

One possibility to consider is that the negative impact of displacement is stronger for bachelor's degree holders because respondents with some or no college education are more likely to die rather than remain alive in poor health. If we apply the logic that mortality is a measure of poorest health, the model would thus underestimate the impact of displacement on health for respondents with no college and

overestimate the difference between the impact for these individuals and those with more education. However, I do not believe this is the case. In 1993, the percentage of former survey participants known to be dead was 3% for those with a bachelors degree; 4% for those with some college education, and 4% for those with no college education. In 2004, the corresponding percentages were 10% for those with a bachelors degree; 10% for those with some college education, and 12% for those with no college. This suggests that the difference in mortality rates among the educational groups is small and is unlikely to fully explain the model results.

Model 5 includes interaction terms for U.S. unemployment rate in the year of displacement, displacement at ages 62 and older and the 2 interaction terms for education with displacement. Because the literature suggests inconsistent effects of age at displacement on earnings and unemployment, and because the coefficients for displacement at ages 50-55 and 56-62 from Model 3 are of very small size and do not indicate clear pattern, I felt that including these coefficients in the final model would add unnecessary noise to the results. I therefore did not include these coefficients in Model 5. In Model 5 I did include a variable for displacement in the past three years in this model in order to control for the fact that most displacements at age 62 and older occurred in the few years before health was measured. This variable thus controls for the possibility that the effect of age is in fact an artifact of the duration since displacement. This does not appear to be the case.

Additional Interpretation of Multivariate Results

In order to help to the interpret the results from the ordered probit model 5, I conducted a series of microsimulations to estimate the impact of experiencing displacement on the predicted probability of having each self-rated health value (1=very poor health, 2 = poor health, 3 = fair health, 4 = good health, 5 = excellent health). Using the coefficients from Model 5, predicted probabilities (of having each self-rated health value) for each respondent were simulated, first assuming the respondent was not displaced, then assuming the respondent was displaced under a variety of conditions. Multiple simulations assuming displacement were constructed in order to vary the age at displacement and unemployment rate at the time of displacement. Each respondent retained their own value for each of the other covariates in each simulation. Separate simulations were conducted for respondents in each educational attainment level. Therefore, the simulated probabilities were averaged across all respondents with a specific educational level.

The average simulated probabilities of having each level of self-rated health are shown in Table 5. For modeling simulations assuming the displacement occurred above age 62, I restricted the sample to responses for the 2004 survey as the 1992-3 survey occurred before the respondents turned 62. I created a simulation assuming no displacement restricted to 2004 sample respondents as a comparison. I excluded respondents with some college from the simulations as the interaction term for displacement with some college education is sizeable but not statistically significant, making interpretations difficult for this group.

Table 5:Ordered Probit Simulations

	1 = Very Poor Health	2 = Poor Health	3 = Fair Health	4 = Good Health	5 = Excellent Health
No College					
All Respondents (N = 7013)					
Not Displaced	0.5%	2.1%	13.4%	63.4%	20.6%
Displaced at age < 62, UR < 6.0[9]	0.4%	1.7%	11.6%	62.6%	23.7%
Displaced at age < 62, UR >= 6.0	0.6%	2.3%	14.5%	63.6%	19.0%
2004 Respondents (N = 3328)					
Not Displaced	0.7%	2.7%	15.7%	63.3%	16.6%
Displaced at age >= 62, UR < 6.0	1.3%	4.2%	20.4%	61.9%	12.2%
Displaced at age >= 62, UR >=6.0	1.9%	5.5%	23.7%	59.6%	9.2%
Bachelors Degree or more					
All Respondents (N = 2986)					
Not Displaced	0.1%	0.6%	6.1%	57.1%	36.1%
Displaced at age < 62, UR < 6.0	0.1%	0.7%	7.2%	59.2%	32.8%
Displaced at age < 62, UR >= 6.0	0.2%	1.1%	9.4%	62.2%	27.1%
2004 Respondents (N = 1431)					
Not Displaced	0.1%	0.8%	7.3%	59.4%	32.4%
Displaced at age >=62, UR < 6.0	0.5%	2.1%	14.2%	64.6%	18.7%
Displaced at age >=62, UR >= 6.0	0.7%	2.9%	17.4%	64.3%	14.6%

We see from Table 5 that for respondents with no college education, there is a small negative impact of being displaced at under age 62, when the unemployment rate is >= 6.0. For instance, the simulated probability of being in excellent health declines from 20.6% to 19.0%. When respondents with no college education are simulated to be displaced at ages 62 and older the impacts on self-rated health are larger. The simulated probability of being in excellent health drops almost in half for a respondent with no college education who is displaced at age 62 or older when the US unemployment rate is >= 6.0. In such a case the simulated probability of being in poor health doubles and the probability of being in fair health increases by almost 50%.

Respondents with a bachelors degree who are displaced under age 62, when the US unemployment rate is >= 6.0, see their simulated probability of being in excellent health decrease by a quarter (36% to 27%) compared to college educated respondents who were not displaced. The (pre-displacement) simulated probability of being in excellent health is 36% for bachelors degree holders and 21% for those without any college education. Therefore, by being displaced in a period of high unemployment, bachelors degree holders lose approximately three fifths of the 'health returns' (in terms of the probability of being in excellent health) to their college education. Even if they are more conservatively compared to similarly displaced respondents without a college education, the health returns (in terms of the probability of being in excellent health) to their college education still decrease by

[9] I include this row in the table for completeness. All variables are included in the simulation whether the coefficient was statistically significant or not (as it is unlikely to truly be 0). The results show a positive impact of displacement for no college education, displaced under age 62 when unemployment rate is < 6.0 because the main effect for displacement is statistically insignificant and small but positive.

approximately 40% (from an education difference of 15 percentage points to one of only 9 percentage points). The impact of being displaced at ages 62 and older is also dramatic for those with a college degree. A respondent with a bachelors degree who is displaced at ages 62 and older when the US unemployment rate is >=6.0 has less than half the simulated probability of being in excellent health compared to a similar respondent who was not displaced. Correspondingly, their simulated probability of being in fair health more than doubles.

Fixed Effects Models

The ordered probit models operate under the assumption that displacement is an exogenous variable vis a vis the health of respondents at the time of displacement. In fact, the displacement variable was constructed specifically to be as exogenous as possible, by excluding involuntary job loss due to being fired (these respondents might be in poorer health) and job losses related to health reasons. However, we can not rule out the possibility that respondents who were displaced were more likely to have unobserved characteristics not captured by the model that might influence their health, irrespective of the experience of being displaced. Such characteristics could include minor health conditions or behaviors that are detrimental to health. This is not an unreasonable concern, as there is evidence that when deciding who to lay off, employers take into account work productivity and other work related characteristics (Romm 1995, Elvira and Zatwick 2002, McCune 1988). These may in turn be related to minor health conditions or other personal characteristics that might influence health It is also possible that respondents who select jobs in industries which have high displacement rates may be more likely to have unobserved characteristics associated with poorer health. In order to address these issues, I also estimated a series of fixed effects models.

The fixed effects model makes use of the panel nature of the data to control for *time invariant* unobserved characteristics not otherwise captured by the model. There are many ways to mathematically represent a fixed effects model, but one way to conceptualize it is that a dummy variable is added to the model for each individual. These dummy variables absorb the effect of unobserved characteristics that are fixed for that respondent over the span of time during which data is collected[10][11].

Because it is not possible to estimate a fixed effects model for ordered probit with two time periods, I have estimated linear fixed effects models[12]. I think this is generally valid for self-rated health as an outcome, because, as contrasted with some types of ordered measures (e.g. church attendance: weekly, monthly never) which are clearly ordered, a self-rating of health on a 1-5 scale is approximately linear in its construction. Clearly it is preferable to use the more flexible ordered probit model, but as that

[10] A general linear model for panel data can be represented as follows: $Y_{ti} = X_{ti}\beta + \mu_i + \varepsilon_{ti.}$ Y_{ti} = a continuous measure of health from 1 to 5. The μ_i represent the unobserved characteristics that are fixed over time. The fixed effects model absorbs these characteristics into a dummy variable for each respondent. Hence they are 'brought into the model': $Y_{ti} = X_{ti}\beta + \sum\alpha_i + \varepsilon_{ti.}$

[11] The fixed effects method is not helpful in controlling for unobserved characteristics of the respondent that vary over time. Therefore the assumption of the fixed effects model is that the relevant unobserved characteristics that might be associated with key independent variables of interest are in fact fixed over time. For this sample, the span of the time over which data were collected is 12-13 years (1992-3 through 2004)[11]. Given that this span of time occurs relatively late in life, when work related characteristics and health related behaviors are fairly well established, I think it is reasonable to expect that the unobserved characteristics of interest will stay fixed over the 12 years. Therefore the fixed effects model will be useful.

[12] When fixed effects models (the dummy variable version) are used with non linear outcomes, the bias can be severe when the number of time periods is small, on the order of close to 100% with t = 2 (Greene 2003). The Chamberlain's fixed effects model is not appropriate to use unless it can be assumed that the outcome will increase over time for some respondents and decrease for others. Since, all else being equal, health tends to decline between age 55 and 65, it is not really a reasonable estimation technique for self-rated health. In addition, the categories would have to be collapsed and health research is sensitive to choice of categories in a scale (Fritjers and Ulker 2007, Idler and Benyamini 1997)

is not possible for the fixed effects model, the linear model is a reasonable substitute[13]. In a fixed effects model, all time invariant characteristics (education, gender) are absorbed into the fixed effect and are not separately estimated. Because the outcome variable (health) was measured in 1992-3 and 2004, all displacements prior to 1992-3 are treated as a time invariant characteristic, as they do not change (occur) between 1992-3 and 2004. Therefore, in the fixed effects model, 'displacement' includes only displacements between 1992-3 and 2004. Earlier displacements are controlled for, but their impact on health is not evaluated[14]. The same is true of other types of involuntary job loss. The impact of other employment related variables such as occupation and industry also are restricted to respondent experiences between 1992-3 and 2004. For instance, occupation and industry variables are recoded from 'ever worked in this occupation/industry' to 'worked in this occupation/industry at some point between 1993-2004'.

As with the ordered probit models, I estimated a series of fixed effects models. The first model evaluates the impact of the main effect of displacement. The subsequent models add variables to assess the moderating impact of the United States unemployment rate (above or below 6.0), the age at displacement (above or below 62 years) and the educational attainment of the respondent (no college education, some college education and bachelors degree or higher). The final model estimates the impact of all moderating factors.

Because the fixed effects models only consider displacements that took place between approximately ages 54 and 65, the interpretation of the interaction terms for age at displacement must be interpreted in this context. That is, the coefficient for age at displacement 62+ is comparing the impact of displacement at ages 62+ with displacement at ages 54-61. An additional caveat is that because the model only specifically estimates the impact of displacements that took place between the two time points when health is measured, it is not possible to distinguish between time since displacement and age at displacement. I therefore will interpret the results of the variable for displaced age 62 and older keeping both the concepts of age at displacement time since displacement in mind[15].

Finally, because the fixed effects models only estimate the impact of displacements between 1992-3 and 2004, the number of displacements is much smaller than in the ordered probit models. For instance, there are only 469 total displacements, 86 of which occur when the unemployment rate is over 6.0, 95 of which happen to respondents with a bachelors degree and 129 of which occurred at ages 62 and older. Therefore the fixed effects models lack statistical power and subsequently results for the interaction terms are sensitive to which category is used as the reference category. In order to make use of as much statistical power as the model can provide, wherever possible, I estimated unemployment rate by displacement, education by displacement and age by displacement as specific groups rather than as main effects and interaction terms. In such models there is no main effect of displacement, only the effect for specific groups. This method avoids the problem of an effect being split between the main effect and the interaction term.

The results from the initial fixed effects model (Model 6) are presented in Table 6 below.

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[13] Using a linear model to estimate an ordered outcome is not uncommon. In fact, Burgard, Brand and House (2007) focus mainly on interpretation of a linear model in their paper, which they note as being comparable to the ordered probit model they also estimated. For purposes of general comparison, and to illustrate the general validity of using a linear model to estimate an ordered outcome, I also estimated Model 6 (my final ordered probit model) using a linear model. In terms of the sign and significance of the key coefficients, the results are comparable to Model 6. Results for this model are available upon request.

[14] If a respondent was displaced more than once, I used the latest displacement; therefore these displacements are included in the fixed effects models. Essentially I created separate variables for involuntary job losses prior to 1992-3 and post 1992-3 for the fixed effects models; the former are simply absorbed into the fixed effect.

[15] Because the ordered probit models suggested that displacement at ages lower than 62 did not have a moderating impact, and because of the smaller range of ages at displacement, in the fixed effects models, I did not include a variable to distinguish between displacement at the various ages between 54 and 61.

Table 6: Impact on Self-Rated Health: Initial Fixed Effects Model

	Model 6	
Displaced	-0.073*	(0.035)
Retirement Displacement	-0.010	(0.050)
Temp/Seas Job Loss	-0.035	(0.053)
Fired/Discharged	0.041	(0.063)
Left job for health reason	-0.334***	(0.037)
Business Failure	-0.061	(0.117)
Year is 1993 (age is @54)	0.172***	(0.025)
Widow/Divorced/Separated	0.052+	(0.031)
Never Been Married	-0.137	(0.251)
(reference: currently married)		
Employed between 1993-204 in the following industry/occupation		
Manufacturing/Mining/Construction	0.022	(0.024)
Professional/Technical	0.042	(0.026)
Executive/Managerial	0.017	(0.025)
Military	-0.222	(0.384)
Farming	0.038	(0.048)
Service	0.048	(0.031)
Administrative/Clerical	0.036	(0.026)
Sales	0.038	(0.029)
Craft/Operator/Laborer	0.033	(0.029)
N = 9682 * p <= .05 ** p <= .01 *** p <= .001 + p < .1		

In Model 6, the main effect of displacement is statistically significant and negative. This indicates that displacements occurring between ages 54 and 65 have a genuine negative impact on health that is not simply due to unobserved characteristics of those who were displaced. As such, the more conservative fixed effect model confirms the results of the initial ordered probit model[16]. As described, I also estimated a series of models to explore the moderating impacts of unemployment rate, education and age at displacement/time since displacement. The key coefficients for these models are shown in Table 7 below.

16 Occupation is not a significant predictor in the fixed effects models. One conclusion is that what appears to be the impact of specific occupational experiences on health in the ordered probit models is in fact due to unobserved characteristics of respondents who choose certain types of occupations. This is quite possible, but it is important to remember that these fixed effects models only capture the impact of occupational experiences between ages 54-65 on changes in health between ages 54-65. It is likely that the effects of occupational experience need to accumulate over a fairly lengthy career in order to have genuine positive or negative health consequences. It is quite possible, therefore, that the any impact which occupational experience is going to have on health has already occurred prior to age 54, particularly since many respondents retire in their early 60s. Thus, the presence or absence of a significant impact of an occupational category in this fixed effects model should interpreted in this light. If we truly wished to examine the impact of occupational characteristics on health using a fixed effects model, we would need health measured over a longer period of the work life span. Similar logic can be applied to some of the other coefficients that show different impacts from the ordered probit models. For instance, the coefficient for never having been married is not significant although it remains large. As noted, the fixed effects model drops all time invariant characteristics and only captures changes that occur between 1992-3 and 2004. It is probable that few individuals who remained unmarried until age 54 were married between ages 54 and 65. Therefore, 'never been married' is likely almost a time invariant characteristic between 1992-3 and 2004 and the model simply lacks the power to detect a significant effect.

As with the ordered probit models, the coefficients for the additional covariates change only minimally across models. The full results from these models are available upon request.

Table 7: Impact on Self-Rated Health: Fixed Effects Models

	Model 6		Model 7		Model 8		Model 9		Model 10	
Displaced	-0.073*	(0.035)							0.018	(0.050)
Displaced & UR >=6			-0.158*	(0.071)					-0.125	(0.077)
Displaced UR < 6			-0.052	(0.038)						
Displaced age 62+					-0.157*	(0.062)			-0.135+	(0.069)
Displaced < age 62					-0.043	(0.040)				
Displaced & BA							-0.150*	(0.071)	-0.120	(0.079)
Displ & some coll							-0.082	(0.083)	-0.042	(0.090)
Displ & no college							-0.047	(0.042)		

N = 9682 * p < .05 ** p < .01 + p < .1

We see from Models 7, 8 and 9 that, similar to in the ordered probit models, the negative impact of displacement on health is restricted to respondents who are either: 1) displaced when the United States unemployment rate is greater than 6.0 (Model 7); 2) are displaced at age 62 or older (Model 8); or 3) have at least a bachelors degree (Model 9). Thus, the findings from the fixed effects models appear to confirm the results from the ordered probit models. Model 10 includes interaction terms for all three moderating factors simultaneously. In this model, the coefficients for each moderating factor are somewhat attenuated and none are statistically significant. Due to the fact that we did find statistically significant impacts of displacement on health either overall or for specific groups in fixed effects models 6-9, I believe that the lack of *any* significant coefficients in Model 10 may be a function of the model lacking statistical power due to small sample sizes of displaced workers. As has been noted, between 1992-3 and 2004 there were only 469 total displacements, 86 of which occured when the unemployment rate is over 6.0, 95 of which happen to respondents with a bachelors degree and 129 of which occurred at ages 62 and older. Essentially the results from the fixed effects models are somewhat inconclusive. The results from models 6-9 appear to confirm the results of the ordered probit models. However to determine whether this is actually true, we would need a larger sample of displaced workers in order to estimate model 10 with enough statistical power to confirm whether or not these effects actually exist.

Discussion

Combining the results from the ordered probit and fixed effects models suggests the following key findings in response to the research questions on page 5:

1) Do displaced workers have worse self-rated physical health outcomes than individuals who have not experienced displacement?

- Yes, but not all groups of individuals displaced under all economic conditions. For respondents with no college education who are displaced under age 62 in a calendar year in which the US unemployment rate is < 6.0, there is not a significant impact on self-rated physical health.

2) Is this impact moderated by economic conditions in the year of the displacement?

- The negative impact of displacement on self-rated physical health is stronger when the displacement occurs in a calendar year in which the US unemployment rate is >=6.0.

3) Is this impact moderated by the age at which the employee was displaced?

- The negative impact of displacement on self-rated physical health is stronger when the displacement occurs at ages 62 and older.

4) Is this impact moderated by the displaced worker's level of educational attainment?

- The negative impact of displacement on self-rated physical health is stronger for respondents with a bachelors degree or more.
- It is possible that displacement may have a stronger negative impact on self-rated physical health for respondents with some college education compared to respondents with no college education, but if this is the case, these models did not have the statistical power to detect it.

These findings have several implications. First, the fact that displacement has worse consequences when it occurs at a point in time when unemployment is relatively high confirms my initial research hypothesis. Individuals displaced in a recessionary period when few job openings are available will likely spend a longer time out of work. They may also be more likely to be forced to eventually accept a position involving difficult conditions such as non-standard or especially long work hours (particularly if they wish to recoup their former earnings as much as possible). Or they may accept a position that simply does not provide the rewards they desire, either in terms of material benefits (such as earnings) or in more intangible factors such as the characteristics of the position and the work environment. Being out of work for a long period of time may result in individuals being forced to spend their savings, leading to a decline in wealth. The fact that relative earnings decline following displacement only accounts for a small portion of the impact of displacement on health suggests that if wealth is relevant, it may be because of the psychological aspects of losing one's savings rather than the material impact on one's day to day life. In addition, the sobering experience of searching for work during a recession may result in a permanent state of anxiety about the possibility of losing one's job; the feeling that if it happened once, it can happen again.

However, in another sense finding that economic conditions are such a strong moderator of the impact of displacement on health are somewhat surprising. It is important to remember that the WLS measures health up to 30 years after the respondents have experienced displacement. During the period of time during which the data was collected, the unemployment rate rose and fell several times. Economic theory would suggests that if respondents are displaced during a period of high unemployment, once the unemployment rate drops, they should be able to more easily find work. If they have been forced to accept a less desirable position in the interim, when economic conditions improve, they should be able to find a more suitable position. The fact that economic conditions in the year of job loss continues to moderate the impact of displacement on health even when health is measured *after* economic conditions improve suggests otherwise. It may be that jobs are more 'sticky' than economic theory would suppose. Respondents forced to accept a position they did not really want may become 'stuck' in this job, unable for a variety of potential reasons to search for and find amore suitable job. More research needs to be done to investigate the factors that enable formerly displaced workers to move from one position to another subsequent to displacement. It is also possible that the health effects of displacement are themselves sticky. That is, respondents may never fully recover from the adverse health impacts of being displaced during a recession. Future research might disentangle whether the permanent adverse health consequences of displacement are reinforced by a lengthy period of difficult working conditions or occur in spite of improved job characteristics over time.

Secondly, although researchers such as Farber (2003), Helwig (2004), Hammermesh (1989) found that respondents without a college degree had worse outcomes following displacement in terms of

earnings replacement and length of unemployment, this does not appear to be translated into adverse health consequences. Rather, the negative impact of displacement on health is stronger for those with a college degree. In time periods when the unemployment rate is relatively low, the impact of displacement on health appears to be a declining middle class rather than a declining working class story. Clearly further research needs to be done into the mechanisms by which displacement impacts the health of college educated respondents.

Using data from the WLS through 1992-3, Brand (2006) found that among college education respondents, displacement was associated with a loss of job autonomy, job authority and occupational status. Katherine Newman (1988) has written extensively on the psychological factors such as shame and loss of work related identity among displaced middle class workers. Further research might examine the role of job characteristics and psychological factors as intervening mechanisms between displacement and health, particularly as this impacts displaced workers with a bachelor's degree. This would dovetail nicely with the growing interest in the public health literature in the relationship between psychological stress and physical health, in particular the mediating role that psychological stress plays in physical health disparities by socio-economic status. Stress is believed to negatively impact physical health through what is referred to as the 'allostatic load': the body's inability to fully physically recover from stressful events (Adler and Rehkopf 2008, Seeman et al 2008).

One additional way in which displacement might lead to increased stress is if displaced workers are working longer hours in order to preserve their income as much as possible. In addition, as with respondents displaced in periods of high unemployment, college educated workers may retain the anxiety that displacement could happen again at any time. More highly educated workers may also be likely to refuse less desirable positions to wait for a job they feel which is commensurate with their skills. While this may serve them well in the long term, it also might result in longer periods of unemployment following displacement and the associated greater anxiety and loss of wealth, similar to the experiences of all workers displaced during a recession.

The fact that displacement does not appear to have a negative impact on the health of young respondents, without any college education, who are displaced when the unemployment rate is relatively low, also needs to be explored further. While it is heartening to think that the impact of displacement does not translate into permanent negative health consequences for such respondents, this phenomena may mask other issues. Such respondents are often employed in jobs that are associated with adverse health consequences, either due to hard labor, poor environmental conditions or simply generally unstable employment environments (even in the absence of displacement) which leads to stress. There is a rich literature on the relationship between job characteristics and health (see for example Brand et al 2007). More research needs to be done on the interplay between displacement, job characteristics and health, particularly among individuals with no college education.

Another important finding is that there is a negative impact of displacement for respondents over age 62. One might expect that respondents still working at age 62 either needed the earnings and benefits more than other individuals or gained particularly high intrinsic rewards from their job. Therefore being displaced might be especially difficult for this age group. In addition, finding new work at age 62 might be especially daunting. The WLS data suggests that respondents displaced at aged 62 and older were slightly less likely to be employed in 2004 than both other displaced workers and respondents who had not been displaced in 2004 (37% employment rate for those displaced at aged 62+ compared to 42% for those displaced at younger ages and 43% for those never displaced). However this is likely a result of the fact that displacements at age 62+ are the most recent. In 1992-3, only 68% of respondents displaced 0-3 years before the survey were employed, as compared to 86% if respondents displaced earlier. A different twist might be that being displaced at ages 62 and older may force respondents who are able to find new jobs to delay their retirement. In any case, it is likely that having a major source of income disappear so close to standard retirement age would result in increased anxiety and stress with consequent negative repercussions on health. More research needs to investigate why displacement is more deleterious for

health for respondents over age 62 as compared to respondents in their 50's, especially because earnings and health insurance status do not appear to be the key factors.

Finally, the fact that in the WLS sample health was assessed up to 30 years after displacement occured suggests that the negative impact of displacement on health appears to be permanent or at least long term and extend beyond the initial period of unemployment. Long term factors such as the characteristics of post-displacement employment may be important. This is additional evidence in support of the notion that instead of just focusing on creating jobs for the displaced, we must focus on creating 'good jobs' that will provide job related identity and stability similar to that which respondents gained from pre-displacement jobs. In addition, 'good jobs' should allow respondents to recoup their former earnings (as much as possible) and provide health insurance, even if these factors are not as crucial in terms of the relationship between displacement and health outcomes as originally thought.

To conclude it is important to note that the WLS sample is quite homogeneous: Nearly all of the respondents are white, all have at least a high school diploma and were born in the late 1930s. It will important to examine if the findings of this paper hold true for people who are not white, may not have a high school diploma and were born in other time periods. It may well be that displacement does have negative impacts on the health of respondents with no college education in the context of a more diverse sample.

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