AGING, JOB SATISFACTION, AND JOB PERFORMANCE

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Abstract

The national trend to earlier retirement is surprising in light of conventional wisdom holding that older workers are healthy, satisfied and productive employees -- sometimes even more so than their younger counterparts. This paper examines whether conventional wisdom is wrong by reviewing existing studies and noting some of their most important shortcomings. New empirical evidence is provided on the links between aging, job satisfaction, and job performance using data from a nationally representative survey of workers.

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In 1950, almost ninety percent of men age 55-64 were in the labor force in the United States. Today, fewer than three-quarters of that age bracket are working or seeking work. An even more stunning decline in labor force attachment occurred among men age 65 and older -- down to only one-fifth from about fifty percent after World War II.

The drop in market attachment among older workers is surprising in light of conventional wisdom holding that older workers are equally if not more healthy, satisfied and productive employees than their younger counterparts. This paper examines whether conventional wisdom is wrong by correcting several shortcomings of previous studies, including the fact that these often analyze unrepresentative data, lack controls for variables correlated with age, and use inappropriate statistical methodology. The overall question posed is: are older workers less satisfied, and/or less productive on the job than are their younger counterparts? If so, the evidence may help explain the trend toward early retirement in the US economy over the last three to four decades.

The plan of the paper is as follows: a first section reviews previous studies which have examined the links between aging, job satisfaction, and job performance, and presents new hypotheses regarding these relationships. These hypotheses are then tested empirically in a second section using a nationally representative

data set known as the Quality of Employment Survey. A final section offers discussion and conclusions.

A Review of Previous Studies

I. Job Satisfaction and Aging

There is a great deal of literature on job satisfaction; indeed, over a decade ago, Locke (1976) enumerated over three thousand studies on the subject. Because the present review focuses only on age/job satisfaction profiles, we limit our attention here to a particular subset of this much larger job satisfaction literature. We begin with a brief discussion of how job satisfaction has been quantified. We then review findings on how job satisfaction profiles change with age, and conclude with a set of hypotheses to be tested in further empirical analysis below.

A. What is Job Satisfaction and How Is It Measured?

Many very elaborate definitions of job satisfaction have appeared in the literature (Locke, 1976). On the other hand, Organ and Hamner's (1982) definition offers little detail yet is easily grasped and perhaps the most complete definition found in the course of our review: "Essentially, job satisfaction is a person's attitude toward his job." The simplicity of this definition belies the difficulty researchers have had pinning down the concept empirically. In industrial relations studies, surveys often ask individuals to assess their own job satisfaction,

usually using one or a combination of three methods. The first is a simple, direct evaluation of overall job satisfaction, based on a single question such as the one in the National Longitudinal Survey: "How do you feel about the job you have now? Do you like it very much, like it fairly well, dislike it somewhat, or dislike it very much?" The second method is also a global measure of overall job satisfaction, but uses several detailed questions pertaining to job aspects, rather than a single overview query. Individuals' scaled responses to these questions indicating the degree of worker satisfaction or dissatisfaction (termed "attitude scales") are then summed or averaged to arrive at an overall assessment. A third method of measuring job satisfaction asks employees to rate specific facets or components of the job (e.g. pay, supervision, pace, etc.) using one of the approaches described above. Though some authors advocate an attitude scale termed the Job Descriptive Index (Hulin & Smith, 1965; Locke, 1976; Muchinsky, 1978), there is no single generally accepted and widely used scale for any of these three measures of job satisfaction (Borjas, 1979). This is perhaps because self-assessment measures are subjective, and as such are somewhat difficult to interpret across individuals.

Despite many differences across studies in the way job satisfaction is measured, evidence seems to point to the conclusion that most workers are satisfied with their jobs. Quinn et al. (1974) note that roughly 80 percent of all workers consistently report themselves as satisfied. Wright and Hamilton (1978) concur, identifying the least satisfied workers as those

under age thirty, where discontent levels are still fairly low--from 14 to 25%.

B. Age and Job Satisfaction

Tables 1 and 2 summarize findings from the recent literature on the empirical linkages between age and job satisfaction. Table 1 focuses on overall satisfaction measures; individual job facets are examined in Table 2. The general consensus appears to be that age is positively related to overall job satisfaction. Early analysts suggested a U-shaped age-satisfaction profile (Bourne, 1982; Hulin & Smith, 1965). However, subsequent research indicates that this U-shaped profile might be positive and linear when other factors are controlled (Hulin and Smith, 1965; Gibson and Klein, 1970; and Hunt and Saul, 1975).[1]

Six specific job facets have been examined most frequently in the industrial psychology literature (Cohn, 1979). These are: satisfaction with work, pay, promotions, supervision, working conditions, and co-workers. Having a positive feeling toward the work itself is generally labelled "intrinsic" satisfaction, while "extrinsic" satisfaction is associated with tangible job rewards including pay, promotion, supervisory relationships, and working

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[1]Previous studies are not unanimous in their conclusions since some report no significant differences in satisfaction by age (Holley et al., 1978; Phillips et al., 1978; Cohn, 1979). However, these conclusions are weakened because those studies utilize broad age groups as compared to other research where the age variable is more narrowly defined. For example, Phillips et al. (1978) define the old as those over age 47, and the young as those under age 47. In general, prior studies do seem to concur that age is positively related to overall job satisfaction.

TABLE 1.

SUMMARY OF RELATIONSHIP BETWEEN AGE AND OVERALL JOB SATISFACTION

STUDY	Gibson & Klein (1970)	Quinn, et al. (1974)	Hunt & Saul (1975)	Stagner (1975)	Glenn, et al. (1977)	Holley, et al. (1978)	Phillips, et al. (1978)	Wright & Hamilton (1978)	Cohn (1979)	Janson & Martin (1982)
SAMPLE	Two samples: (1) 385 blue-collar workers mainly women, rural South (2) 1682 blue-collar males drawn from bigger pop. of 18 plants; dispersed location	7 national surveys 1958-1973	3253 male/550 female white-collar workers form large Australian government organization	Cites unpublished study of large sample, auto-related, blue-collar workers	1080 white males/461 white females; probability sample of U.S. population for 1972/73/74	362 female paraprofessionals; Alabama Extension Service	71 blue-collar workers; large auto plant	QES 1972-73; males 16-64	Subsample of males 21-64 from a national sample	QES 1972-73; sample of 1455 workers
METHODOLOGY	Analysis of variance for 1 & 2; partial correlation for 2 (different age & tenure groups in each sample)	Simple tabulations (% satisfied workers in each age category)	Multiple regression analysis	Simple tabulations	Zero-order correlation	T-tests	Individual data: correlation; group data: analysis of variance	Simple tabulations	Analysis of variance	Simple tabulations (derivations from grand mean of J.S. score)
OTHER CONTROL VARIABLES	Tenure	None	Tenure	None	None	None	Education Tenure	None	None	None
JS MEASURE	One question	One question	Attitude scale	Attitude scale	One question	Attitude scale	Job Descriptive Index	One question	Attitude scale	Attitude scale
ESTIMATED EFFECT OF AGE ON J.S.	+ linear	6 of 7 surveys; + increasing relationship	MALES + linear; FEMALES NS	+	MALES + corr.; FEMALES + corr.	NS	Individual data: NS; Group data: No diff. in satisfaction between young (≤47) and old (>47)	+	No difference in satisfaction between age groups 21-34/35-44/45-54/55-64	+

NOTE: All effects reported are statistically significant unless otherwise indicated. NS signifies not significant.

TABLE 2.

SUMMARY OF RELATIONSHIP BETWEEN AGE AND JOB FACET SATISFACTION[1]

STUDY	Hulin & Smith (1965)	Gibson & Klein (1970)	Hunt & Saul (1975)	Schwab & Heneman (1977)	Holley, et al. (1978)	Muchinksy (1978)	Cohn (1979)
SAMPLE	185 male / 75 female random sample of New England, electronics manufacturing workers (verified results on a sample of 700 from 4 companies in East & Midwest)	Two samples: (1) 385 blue-collar workers, mainly women, rural South (2) 1682 blue-collar males drawn from bigger pop. of 18 plants; disperse location	3338 male / 579 female white-collar workers from large Australian government organization	96 male / 177 female Midwest blue-collar operatives from one firm	362 female para-professional; Alabama Extension Service	494 workers; statewide public utility	Subsample of males 21-64 from a national sample
METHODOLOGY	Multiple regression analysis	Analysis of Variance for 1 & 2; partial correlation for 2 (different age & tenure groups in each sample)	Multiple regression analysis	Partial correlation (corrects for multicollinearity between age & tenure)	T-tests	Scheffe test checks for diff. in mean scores between age groups	Analysis of variance
OTHER CONTROL VARIABLES	Age; job tenure; company tenure; job level; salary; salary desired minus salary received	Tenure	Tenure	Tenure	None	None	None
J.S. MEASURE	Job Descriptive Index (JDI)	One Question	One Question	JDI[2]	One Question	JDI	One Question

RESULTS: Nature of Relationship of Age and Job Satisfaction With

	MALES	FEMALES		MALES	FEMALES	MALES	FEMALES			
WORK	+ linear	NS	+ linear	+ linear	+ linear	+	NS		18-29 less satisfied than ≥30	21-34 less satisfied than ≥35
PAY	+ linear	NS	+; not completely linear; flat to 40, linear after 40	NS	- linear	NS	NS	≥57 more satisfied than ≤47	- monotonic	NS
PROMOTIONS	NS	NS		- linear	- linear	NS	NS		- monotonic	
SUPERVISION	NS	NS	+; linear to 50, then levels off	curvi-linear	NS	NS	NS	NS	NS	
WORKING CONDITIONS	NS	NS		curvi-linear	NS					
CO-WORKERS				curvi-linear	NS	NS	NS	NS	≥50 less satisfied than <50	

Notes: [1]All effects reported are statistically significant unless otherwise indicated. NS signifies not significant.

[2]This study also used the Minnesota Satisfaction Questionnaire and concludes that age is not significantly related to an extrinsic satisfaction measure for both sexes. Age is positively related to intrinsic work satisfaction for both males and females, and the coefficients are statistically significant.

conditions. In addition, aggregate measures are sometimes used instead of those based on single components (Schwab and Heneman, 1977).

A review of Table 2 indicates no consistent pattern among studies regarding the link between age and individual job facet variables. Only one generalization can be drawn from the evidence reviewed: satisfaction with the content of the work itself appears positively and linearly related to age among male employees. There is no other regular pattern discernable between job facets and age for men, and for women no significant results are discerned for any measures.

Part of the inconsistency in the research on aging and job component satisfaction may be due to the fact that job facet measures differ from one analysis to the next. Data samples are also nonrepresentative, since they are usually specific to one or a few firms, and/or cover only a subset of workers (e.g. blue or white collar workers, or males only). This may also explain the insignificant results for females. The fact that many studies do not hold constant other important variables, such as pay and experience, offers an additional potential explanation for the observed lack of agreement. Finally, the evidence is also compatible with the conclusion that job facet questions measure something rather different than do overall job satisfaction queries.

C. Limitations of Previous Research

This overview indicates that existing research does not fully specify the links between age and job satisfaction patterns. Measurement problems in the dependent variable of interest, job satisfaction, tend to render results noncomparable across studies. Lack of sophisticated methodology is also a serious limitation. In several instances, no appeal is made to statistical tests at all, and though some researchers do employ statistical techniques, they limit themselves to simple ones (e.g. zero-order correlations) without controlling for other variables which are correlated with age (e.g. pay, experience, and education). A related methodological limitation characterizing all existing studies is the fact that none corrects for the possibility that older job incumbents are a nonrandom sample. Indeed, if workers move out of more demanding jobs as they accumulate seniority, those older workers remaining in their jobs are more likely to be satisfied because they are a self-selected group. Another shortcoming of existing studies has to do with the data samples employed. Most use case studies, which are far from being nationally representive. Because of the reliance on cross-sectional surveys, the link between age and job satisfaction for the same workers over time has not been thoroughly assessed. Finally, each paper defines "old" and "young" differently. These render comparisons across studies difficult.

D. Research Implications

Though the evidence is far from complete, it does suggest that older workers are generally more satisfied with their jobs than do younger employees. A possible explanation for this phenomenon is that job satisfaction rises with age because older workers have more attractive jobs than do younger ones. This view is termed the "life cycle hypothesis". One implication of this theory is directly testable: after controlling on job characteristics like occupation and industry, there should be no remaining systematic age effects in a job satisfaction model. Early empirical analyses of this hypothesis did demonstrate a positive correlation between age and job satisfaction, but focused only on broad occupational groupings; for instance, Wright and Hamilton (1978) examine white collar workers as a whole, and no finer occupational breakdowns are given. More recent research (for instance, Janson and Martin, 1982) finds that controls on occupation and industry have little discernable impact on the correlation between age and job satisfaction. The ongoing empirical controversy underscores the value of a further examination of the evidence.[2]

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[2] A variant on this hypothesis is consistent with recent research in labor economics on long term contract theory (c.f. Hutchens, 1986; Lazear, 1979). In this view, some firms find it advantageous to underpay workers when they are young in exchange for overpayments when the workers grow older. Such a "backloaded" compensation scheme has the effect of raising productivity by tying workers to their jobs, with a consequent reduction in turnover, search and hiring costs. An older worker in this setting may thus report himself as satisfied with his job because at that firm his pay exceeds marginal product (and his pay at that firm is also greater than he could expect to draw at some alternative firm where wage would equal his marginal product).

A competing explanation for the positive empirical link between aging and job satisfaction we call the "self-selection" hypothesis. This view holds that satisfied workers are more likely to remain with their employer, and older workers are those most likely to have long tenure. Hence, job satisfaction may appear higher for older workers when tenure is not held constant, simply because tenure is correlated with age. This theory can be tested on the basis of its prediction that the positive age/job satisfaction link should decrease (if not disappear) after controlling for time on the job.

Using a data set to be described in more detail below, we propose to test between these two alternative explanations for the positive relationship between age and job satisfaction.[3] The data

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To eliminate this possibility it would be necessary to control for productivity differences across firms due to backloaded pay schemes. Unfortunately productivity is only imperfectly represented by the other control variables usually available in most data sets. Nevertheless, such a spurious age/job satisfaction relationship should be lessened once tenure is controlled, since a Lazear-style long term contract should apply to long-term employees rather than older workers, per se.

[3]Two other social and psychological explanations for the age/job satisfaction link have been mentioned in the literature, but are not directly testable with available data. One is the "cohort theory", which holds that today's young workers are less satisfied because they are the product of a different, less materialistic generation which seeks more fulfillment from its employment than did the earlier cohort. (Aronowitz, 1973, advanced this notion, among others.) One reason that this hypothesis is impossible to test directly is that no available data sets contain the necessary longitudinal information on several different cohorts. An indirect test by Janson and Martin (1982) employs proxy variables to control for factors like education which vary by cohort, and rejects the hypothesis.

A different view, termed by some the "grinding down hypothesis", holds that older workers are more satisfied with their jobs because the proces of aging lowers youthful expectations. A direct test of this hypothesis is also impossible

set we use contains measures of workers' job satisfaction, tenure, and job characteristics, providing many of the variables needed to distinguish between the theories.[4]

II. Aging and Job Performance

Existing studies on aging and productivity profiles are of two types. One set of analyses, which we examine first, seeks direct empirical confirmation of productivity changes with age using longitudinal data on worker output. However, direct measures of workplace performance are typically unavailable to social scientists. Therefore, a second set of studies is also examined which contains indirect evidence on factors like workers' health and job limitations due to health problems, to further reveal age/job performance linkages.

A. Measuring Productivity Changes With Age

There is a large literature on the impact of age on physiological and psychological functioning (c.f. Bourne, 1982; Brousseau, 1981; and Coates and Kirby, 1982). Many analysts argue

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at present, since longitudinal data are not available on how job satisfaction changes with age for a given worker, holding other factors constant. Lacking longitudinal data, previous studies have compared older and younger workers' expectations, and conclude that aspirations are generally similar (Wright and Hamilton, 1978). Hence this hypothesis is not supported with available data.

[4]Self selection may affect empirical job satisfaction measures for older workers in another way as well -- older workers who are unhappy with their jobs may be more likely to retire. The data set analyzed below also excludes retirees, so this possibility cannot be directly addressed here either. Future research should address this issue in more depth.

that age has a "decremental" effect on physical and mental capabilities on average, though some have suggested that the variability in individual capabilities also increases with age. Age-related physiological changes include a deterioration in sensory functions (hearing and vision), lung capacity, muscular strength, and bone structure (Coates and Kirby, 1982; Fleisher and Kaplan, 1980; and Riley and Foner, 1968, review several studies on these issues). There is also some evidence of declines in mental capabilities with age. Psychomotor skill (measured by response speed) peaks in the mid-twenties and declines slowly thereafter. Bourne's overview (1982) reports that older people tend to be more anxious, exhibit greater caution, and take longer to make decisions as compared to younger people. Time pressure and increased task complexity also tend to reduce older peoples' efficiency. For example, the ability to learn new tasks is comparable between the young and the old, as long as time constraints are not imposed (c.f. Baugher, 1978; Fleisher and Kaplan, 1980). On the other hand, longitudinal analysis which controls for cohort effects (via education) indicates that intelligence does not decline until around age 70 (Brousseau, 1981). Verbal skills and information processing capacity have been found to remain constant or increase with age.

Unfortunately, most of these general findings on age and performance pertain to overall functioning in laboratory settings and thus may not be relevant to performance on the job. A few productivity studies which were conducted at the workplace indicate that older workers perform, on the whole, as well as

their younger counterparts. Indeed, in some cases, their greater experience, training and judgement resulted in superior performance (Brousseau, 1981; Fleisher and Kaplan, 1980; Sonnenfeld, 1978).

Nonetheless, several problems make it difficult to draw reliable conclusions about the shape of age/job productivity profiles based on these studies. First, job productivity (output produced per labor hour) is inherently difficult to quantify. One direct approach to measuring output uses piece-rates, a practice common for instance in the garment industry. But pay scales depend solely on an individual worker's output in only a tiny minority of jobs. In addition, measuring productivity using piece rates does not hold quality of output constant. A different method of quantifying worker output relies on worker self-reports, but here too data accuracy has been proven to be problematic. The method preferred by personnel practitioners is performance evaluation. It involves observers' interpretations of jobs using rating and ranking schemes, descriptive essays, job content checklists, and the like. These approaches are also prone to error, however, and further refinement is currently being attempted (Gibson et al., 1983).

Because of the difficulties inherent in measuring worker productivity, a second groups of analysts has chosen to use proxy variables to reveal productivity changes with age. These include indicators of absenteeism, turnover, illness, and accident rates. Here the data show that older workers tend to be absent for reasons of illness less often than the young, but experience

longer recovery periods and lose more workdays per year when illness occurs (Coates and Kirby, 1982). Health problems therefore appear to affect the labor market attachment of older workers (Coates and Kirby, 1982; Giniger et al., 1983; Riley and Foner, 1968; Sonnenfeld, 1978).

On-the-job accidents and injuries are alternative indicators of age-linked productivity problems. Data on frequency of accidents indicate the probability of injury, usually expressed in terms of the number of injuries per worker per time period exposed. Severity of injury data, on the other hand, measure the degree of impairment associated with an injury received; severity is usually classfied into temporary and permanent disability, or fatality. Most studies on the link between aging and worker accidents report that young employees are more likely to be injured on the job than are older or prime-age workers, by virtue of their lack of work experience. For instance, Kossoris (1940) finds that the frequency of occupational injury falls with age when examining evidence on American, Swiss and Austrian workers. Later studies by Dillingham (1979, 1981a) and Root (1981) support his conclusion. However the exact shape of the relationship remains a matter of controversy; it is still an open question as to whether injuries decline smoothly with age, or whether some other pattern is prevalent. Root, who tabulates 1977 U.S. information collected from 30 states' Workers' Compensation files, finds a declining incidence of injuries with age. Using New York State data, Dillingham (1979, 1981a) finds that males under age 25 have the highest injury rates, with the rate for

those over 25 only half what it is for the younger group. My own research study (Mitchell, 1988) is one of the very few to test for statistically significant differences in injury frequency by age after controlling for other variables. In general, injury rates rise appear to rise with age only for those workers age 65 and older.

Though the evidence shows that older workers do suffer fewer injuries, it has been conjectured that older workers' injuries are more serious than are younger workers'. On this point, Kossoris concluded that older workers when injured are more likely to sustain a longer recovery period if temporarily disabled, and have higher rates of permanent disability and death, as compared to the young. Root (1981) agrees that job-related death and disability rates are higher among older employees. In addition, he notes that temporary disabilities are more prevalent among the young. Dillingham's (1979) work supports these inferences in general, though he argues that permanent disability rates are highest among the under-25.

As with the frequency rates, the exact shape of the age/severity relationship is the subject of controversy. Kossoris detects a positive trend in the severity of injury with age in Swiss and U.S. data, where severity is defined as the proportion of deaths and permanent disabilities per thousand injuries. Death rates conditional on injury are somewhat higher for workers in their fifties, with greatly increased rates for those over age 60. The pattern for permanent disabilities, while similar, is less clear but still suggestive. In contrast, evidence from New York

state shows U-shaped profiles (Dillingham, 1979). Workers under age 25 suffer the highest permament disability rates, while those 45 and over have the highest fatality rates. Both death and permanent impairment rates are lowest for the 25-44 year olds. Root (1981) finds no distinct pattern between age and severity. None of these studies tests for statisically significant differences in severity by age.

Only one study, that by Root (1981), deals with injury characteristics by age. Though he examines the nature, source, and type of injury as well as the part of the body affected, he notes that the percentage of workers in all age brackets suffering each kind of injury appears about the same. Generally older workers seem to have more hernias, heart attacks and fractures, but fewer cuts, lacerations, and burns, than do the young. Injuries due to falls rise with age. However no statistical tests are provided to indicate whether these general patterns are significant statistically or not.

There is also evidence on poor health and age patterns as they vary across occupations and industries (Mitchell et al., 1988). For instance, surveys adminstered to retirees age 55 and over indicate that their reasons for leaving their previous occupation often include poor health (U.S. Bureau of Labor Statistics, 1980, 1982, 1985). My calculations using these data imply that poor health is offered more often as a reason for retirement by men leaving blue-collar occupations (about one-quarter reply that poor health induced them to leave) as compared to white-collar males (only 15% of the group cited poor health).

A positive relationship between poor health and age is corroborated by studies which use longitudinal rather than cross-sectional data; Schwab (1974) computes the percentage of men age 58-63 with self-reported health-imposed work limitations by occupation of longest job, and finds that blue-collar employees (e.g. craftsmen, operatives, nonfarm laborers) are more likely to report health-related work limitations than are those in white-collar occupations (professionals, managers, clerical and sales).[5] This is compatible with Andrisani's (1977) reports as well as more recent work by Gustman and Steinmeier (1985). While the evidence clearly shows that blue-collar workers with health limitations leave the labor force far more often than do white-collar employees, it is not yet clear whether health limitations hinder productivity more powerfully in blue-collar jobs, or whether distaste for work is stronger among blue-collar employees, so that a given health limitation has more of a deterrent effect than for white-collar workers.[6]

Very little information exists on intersectoral differences in job risk by age. The U.S. Department of Labor (1980, 1982, 1985), Root (1981) and Dillingham (1979) show that blue-collar

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[5]Since Schwab's data sample includes workers and non-workers, this analysis is less likely to be subject to sample selection problems described elsewhere.

[6]In addition to these indirect studies of age/productivity profiles, there is some direct evidence gathered from case studies of white-collar workers (e.g. scholars, scientists and artists; managers; sales and clerical workers, and paraprofessionals), and blue-collar workers (e.g. manual laborers and printing press workers). See Mitchell et al., (1988).

jobs are more dangerous in absolute terms than other jobs, particularly in the construction and manufacturing industries. Dillingham (1983) also finds that (1) the frequency of injury is lower for older workers than for those younger than age 25, among blue-collar, white-collar and service jobs; (2) injury severity generally worsens with age for all three occupational groupings; and (3) aging is associated with the highest absolute fatality risk in blue-collar jobs. The frequency of temporary and permanent disabilities, as well as fatalitites, is also highest in absolute terms for blue-collar workers in corresponding age groups, relative to other workers. My own regression analysis (Mitchell, 1988) confirms that age and occupational status are the primary determinants of injury risk among males. Dillingham (1981b) further claims that age and injury rates are positively linked for women workers.[7]

B. Limitations of Previous Research

A serious problem confronting researchers interested in investigating how productivity patterns change with age is the absence of nationally representative data containing productivity information. Because no survey contains all the information necessary to assess productivity patterns by age, many authors have resorted to using other types of information which attempt to measure productivity indirectly. Few existing studies test for

[7]Also important is the relationship between age and job-related illness, but data on occupational illness are extremely poor due to the difficulty of collecting such data.

age effects using modern statistical tools or control for other relevant variables. Even when age is held constant, aggregation of age groups makes it virtually impossible to evaluate differential risk patterns for particular subsets of older workers. Seniority on the job is rarely controlled, so that it is impossible to determine whether age or inexperience is the factor more closely associated with risk. Evidently, a more detailed statistical analysis of age patterns by sector would be informative.

C. Research Implications

While previous studies on health, age and job performance indicate that older workers are often as productive and are injured less frequently than younger ones, these studies do not identify whether age is the explanation for the negative age/job risk profile, or rather whether age might be reflecting a "life cycle" phenomenon. It is known that older workers are employed in somewhat different occupations and industries as compared to younger ones, and are thus exposed to fewer and different health risks (e.g. they are more likely to be supervisors). One testable implication of this life cycle hypothesis is that the relationship between age and performance problems should decline and perhaps disappear when job characteristics like occupation and industry are controlled. In addition it would be useful to further explore empirically Dillingham's (1979) finding that older workers suffer more severe health repercussions when injured, though the incidence of injuries seems to fall with age. More severe problems among older workers may simply be the result of cumulative

exposure to job risks, since many health problems take years to develop (e.g. those associated with exposure to environmental hazards in particular industries and occupations). This "exposure hypothesis" has a testable implication, in that controlling for tenure, one would anticipate that the effect of age on productivity problems due to poor health would be moderated or eliminated.[8]

Below, we investigate empirically how workers' health status and health limitations on the job change with age, as we seek to determine whether age exacerbates or moderates general and specific work-related health problems. The greater severity of older workers' job-related health problems may be due to greater exposure, a hypothesis which will also be tested below.

Empirical Analysis

I. Data Employed

To investigate how aging affects workers' performance and job satisfaction we focus on a sample of 787 wage and salary workers (61% males and 39% females) from the 1977 Quality of Employment Survey file (QES). Collected by the University of Michigan Institute for Social Research, the data set contains extensive information on a nationally representative sample of workers and

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[8]This assumes that tenure on the job is a reasonable proxy for tenure in the sector. Since this correlation is low for some workers, tenure in the occupation and industry would be more useful. Very few data sets report this datum, however.

their jobs. The QES contains many different questions useful for delving into employee dissatisfaction and performance. For the present purposes, these are organized into two main types, termed here "job dissatisfaction" variables, and "problems with worker productivity and health" variables. (Table 3 provides detail about empirical variables and their definitions.)

Indices for job dissatisfaction range from a general indicator ("Unsatisfied") to several detailed questions regarding specifics about a worker's compensation ("Pay bad") and intrinsic job content ("Meaningless", "Fast pace", "Danger", "Contaminants"). Variables indicating perceptions of productivity and health problems are of two types. One set of factors indicates workers' perceptions of their own health status. The second set reveals employees' perceptions of strain and limitations on the job due to health factors. Because self-assessment health indices of this sort are imperfect measures of true health status (Bazzoli, 1985; Parsons, 1982), we focus on the more objective measure available in the data, work time lost due to illness or injury ("Weeks sick"). If a worker mentions specific ailments (e.g. tiredness, back problems or shortness of breath), those too are noted. Finally, the individual is asked to indicate the existence of circulatory, respiratory, muscular or skeletal afflictions exacerbated by working conditions; these too are examined in some depth. Except for the "weeks sick" variable which is continuous, all outcome measures take on a value of one if the worker indicates dissatisfaction with the job or its content, and zero otherwise.

Table 3.

Indices of Job Satisfaction and Worker Productivity

I. Job Content and Satisfaction Variables:		Mean
Job Satisfaction:		
Unsatisfied	= 1 if somewhat or very unsatisfied with job; 0 else.	11%
Meaningless	= 1 if work is not main satisfaction, or job meaningless or uninteresting, or job requires little learning, or work repetitive; 0 else.	3%
Pay Bad	= 1 if pay or fringe benefits are bad; 0 else.	22%
Job Content:		
Fast Pace	= 1 if required to work fast or not enough time to do job; 0 else.	29%
Danger	= 1 if worker exposed to dangerous equipment; 0 else.	28%
Contaminants	= 1 if worker exposed to pollution, fire, chemicals, extreme temperatures indoors; 0 else.	59%
II. Worker Productivity and Health Variables:		
Health Status:		
Weeks Sick	= number of weeks away from work due to illness or injury.	1.31
Tired	= 1 if worker tires in short time; 0 else.	26%
Breath	= 1 if worker has difficulty breathing; 0 else.	19%
Back	= 1 if worker has back trouble; 0 else.	36%
Health and Job Limitations:		
Circulation	= 1 if worker has ailment of circulatory system limiting work; 0 else.	1%
Muscle/ Skeletal	= 1 if worker has muscular/skeletal ailment limiting work; 0 else.	3%
Nerves	= 1 if worker has nervous disorder limiting work; 0 else.	2%
Respiratory	= 1 if worker has respiratory problems limiting work; 0 else	.4%

Before evaluating the specific theories linking aging with job satisfaction and performance indicators in a multivariate context, it is useful to obtain a general impression of the patterns of outcome variables by age in this data set. Table 4 presents, for this nationally representative sample of workers, a breakdown of the values of job satisfaction and performance outcomes for workers in two age groups: those under the age of 55, and those age 55 and over.[9] In this survey, the data show that older and younger workers' reports to the questions differ at conventional statistical levels for only half of the fourteen variables. Specifically, there proves to be no age difference among workers regarding opinions about whether their jobs are dangerous, or expose them to contaminants or danger; there is also no difference by age in the workers' assessment of their pay. Older and younger workers also prove to be equally likely to report breathing problems, difficulties with their backs, and with being tired.

Where responses do differ statistically across age groups, older workers prove to have fewer (rather than more) complaints as compared to their younger counterparts in four out of seven cases. With regard to a general job satisfaction index, the data agree with findings elsewhere in the literature: specifically, older workers are statistically more likely to be satisfied with their

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[9]The QES data analyzed here contains 153 workers under age 25, 241 aged 25-43, 156 aged 35-44, 136 aged 45-54, 88 aged 55-64, and 13 age 65 and over. Analysis of finer age categories is precluded by the relatively small sample sizes at the older end of the age spectrum.

Table 4.

Average Values of Satisfaction and Performance Variables by Age Group

		Under Age 55	Age 55 and Older
I.	Job Content/Satisfaction		
	Unsatisfied (%)	12	6**
	Meaningless (%)	4	0**
	Pay Bad (%)	22	18
	Fast Pace (%)	73	60
	Danger (%)	29	26
	Contaminants (%)	59	57
II.	Worker Productivity/Health		
	Weeks Sick (#)	1.39	0.78**
	Tired (%)	25	32
	Breath (%)	19	22
	Back (%)	36	40
	Circulation (%)	0.3	6**
	Musc/Skel (%)	2	7**
	Nerves (%)	2	1**
	Respiratory (%)	0.1	2**
	Total N	686	101

**Means statistically different at p = .05.

Note:
For variable definitions see Table 3.

work, and far fewer criticize their job content as meaningless compared with younger workers. In general, then, the QES survey offers no evidence of older workers being less satisfied with jobs than younger employees, either in general or with regard to specific facets.

A more mixed picture prevails for the indicators of worker productivity and health limitations on the job. Older workers report a significantly lower rate of time off due to sickness, and lower rates of limitations due to nervous conditions. On the other hand, older workers attest to being more hampered on the job due to circulatory, rspiratory, and muscular/skeletal conditions than their younger peers.

In general, the simple tabulations imply that there is no unidirectional empirical link between aging, job satisfaction and job performance, suggesting the importance of further analysis before firm conclusions can be drawn.

II. Multivariate Analysis

A multivariate format is needed to probe age differences while holding constant measurable job and worker characteristics that differ by age. This is accomplished by controlling measurable differences across jobs and workers with models of the form:

$$y = f(\mathbf{A}, \mathbf{X}, e)$$

where y is the dependent variable of interest; **A** is a vector of age terms; **X** is a vector of other explanatory terms; and e is a random disturbance term. Two empirical approaches are employed: multinomial Logit which takes into account the fact that most of

the the dependent variables of interest are dichotomous rather than continuous,[10] and linear regression in the one case where the dependent variable is continuous rather than qualitative ("Weeks off") .

Two sets of models are presented below for the job satisfaction and content variables, differing in the way in which the age variables are formulated. Table 5 uses age and age-squared as controls, indicating whether the outcome in question becomes more or less prevalent with age, and whether the outcome becomes more or less prevalent with increasing age. To assess the robustness of the aging variables a different way, we also estimate models in which binary age controls indicate whether the respondent is under age 25, or age 55+ (the reference category is workers age 25-54). These results appear in Table 6. In general, if an explanatory variable has a positive (negative) coefficient this should be interpreted as a direct (inverse) association between that variable and the outcome in question. For instance when age is negatively associated with the outcome "Unsatisfied", this indicates that older workers are less likely to report that they are dissatisfied with their jobs. In all cases coefficient estimates must statistically significant at at least the 10% level (indicated by one asterisk), or 5% (two asterisks) in order to warrant attention in the discussion below.

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[10]Other authors who use qualitative variables in the QES data set do not employ nonlinear models (c.f. Janson and Martin, 1982; Wright and Hamilton, 1978).

Table 5.
Age and Other Determinants of Job Satisfaction, Productivity and Health
(Standard errors in parens)

	Unsatisfied (1)		Meaningless (2)		Pay Bad (3)		Fast Pace (4)		Danger (5)	
AGE	-.02	.02	.06	LIMIT-	.17**	-.13**	.05	.05	-.04	-.10**
	(.06)	(.06)	(.13)		(.04)	(.04)	(.04)	(.04)	(.04)	(.05)
AGESQ	.00004	-.0003	-.002		.002**	.002**	-.001**	-.001	.0003	.001
	(.0001)	(.001)	(.002)		(.001)	(.001)	(.0005)	(.001)	(.001)	(.001)
TENURE		-.04*				-.05**		.03*		.003
		(.02)				(.02)		(.01)		(.02)
UNION		-.27				-.21		-.07		.32
		(.27)				(.22)		(.18)		(.20)
FEMALE		.33				.21		.33*		-1.13**
		(.28)				(.21)		(.20)		(.24)
FRSIZE		.0002				-.0004**		-.0002		.0002
		(.0001)				(.0001)		(.0001)		(.0001)
Industry Controls		xx				xx		xx		xx
Occupation Controls		xx				xx		xx		xx
Log:	-269.89	-271.51	-109.79		-401.09	-411.95	-467.62	-470.97	-464.94	-468.19
Chi:	3.3	23.1	8.9		21.7	80.7	6.7	30.4	6.5	207.7
	(2)	(14)	(2)		(2)	(14)	(2)	(14)	(2)	(14)

Table 5. Continued
Age and Other Determinants of Job Satisfaction, Productivity and Health
(standard errors in parens)

	Contaminants (6)		Weeks Sick (OLS) (7)		Tired (8)		Breath (9)	
AGE	-.05	-.09**	.27	.24	-.06	-.09**	.01	.01
	(.04)	(.04)	(.27)	(.28)	(.04)	(.04)	(.04)	(.05)
AGESQ	.0004	.001	-.004	-.004	.001*	.001**	.0001	.00002
	(.0004)	(.001)	(.003)	(.003)	(.001)	(.0001)	(.001)	(.001)
TENURE		.02		.05		.01		-.02
		(.01)		(.09)		(.01)		(.02)
UNION		.55**		-.09		.58**		.21
		(.19)		(1.25)		(.18)		(.21)
FEMALE		-.55**		-1.01		.49**		.54**
		(.19)		(1.32)		(.20)		(.22)
FRSIZE		.00004		.001		-.0001		-.0002*
		(.0001)		(.001)		(.0001)		(.0001)
Industry Controls		xx		xx		xx		xx
Occupation Controls		xx		xx		xx		xx
Log:	-530.47	-532.44			-450.66	-452.43	-382.19	-383.34
Chi:	3.9	200.9	(R^2 =	(R^2 =	3.6	25.3	2.33	30.5
	(2)	(14)	.002)	0.02)	(2)	(14)	(2)	(14)

Table 5. Continued
Age and Other Determinants of Job Satisfaction, Productivity and Health
(standard errors in parens)

	Back (10)		Circulation (11)		Musc/Skel (12)		Nerves (13)		Respiratory (14)	
AGE	-.02	-.03	LIMIT	LIMIT	.04	-.01	-.06	LIMIT	LIMIT	LIMIT
	(.04)	(.04)			(.11)	(.12)	(.12)			
AGESQ	-.001	.0004			.00003	.00003	.001			
	(.001)	(.001)			(.001)	(.001)	(.002)			
TENURE		.01				.05*				
		(.01)				(.03)				
UNION		.35**				.11				
		(.17)				(.49)				
FEMALE		.51**				-.93				
		(.18)				(.66)				
FRSIZE		-.0001				-.001				
		(.0001)				(.0004)				
Industry Controls		xx				xx				
Occupation Controls		xx				xx				
Log:	-515.18	-515.76			-100.58	-103.91	-77.94			
Chi:	1.2	29.5			6.7	28.3	0.4			
	(2)	(14)			(2)	(14)	(2)			

Notes:
** $t \geq 1.96$
* $t \geq 1.65$ (<1.96)

Since most dependent variables are dichotomous, equations 1-6, 8-14 are estimated using multinomial Logit. A negative coefficient indicates that the explanatory variable reduces the probability of the outcome in question. "Log" indicates the log likelihood value for all explanatory variables but the constant term being significantly different from zero; the "Chi" term is the associated Chi square value for this hypothesis test (degrees of freedom are indicated in parentheses). A reported value of "Limit" indicates the Logit model did not converge due to too few cases in one category of the dependent variable. Since "Weeks Off" is a continuous dependent variable, equation 7 is estimated using linear regression. Here R^2 values are reported in lieu of Log values. A notation of "xx" signifies that these variables were also included in the model in question.

Table 6.
Age and Other Determinants of Job Satisfaction, Productivity and Health
(Standard errors in parens)

	Unsatisfied (1)		Meaningless (2)		Pay Bad (3)		Fast Pace (4)		Danger (5)	
AGE25	.25	-.05	.82**	LIMIT	.49**	.20	-.03	.04	.21	.47*
	(.27)	(.30)	(.41)		(.21)	(.23)	(.15)	(.23)	(.20)	(.26)
AGE55	-.68	-.56	-6.73		-.16	.09	-.58**	-.71	-.09	-.27
	(.44)	(.46)	(16.34)		(.28)	(.31)	(.23)	(.24)	(.25)	(.29)
TENURE		-.04*				-.05**		.02*		.01
		(.02)				(.02)		(.01)		(.01)
UNION		-.27				-.24		-.04		.31
		(.27)				(.22)		(.18)		(.20)
FEMALE		.34				.21		.32*		-1.12**
		(.28)				(.21)		(.20)		(.24)
FRSIZE		.0002				-.0004**		-.0002**		.0002
		(.0001)				(.0001)		(.0001)		(.0001)
Industry Controls		xx				xx		xx		xx
Occupation Controls		xx				xx		xx		xx
Log:	-271.51	-271.51	-114.23		-411.95	-411.95	-470.97	-470.97	-468.19	-468.19
Chi:	4.2	24.5	10.9		6.57	72.6	6.6	28.8	1.5	200.5
	(2)	(14)	(2)		(2)	(14)	(2)	(14)	(2)	(14)

Table 6. Continued
Age and Other Determinants of Job Satisfaction, Productivity and Health
(standard errors in parens)

	Contaminants (6)		Weeks Sick (OLS) (7)		Tired (8)		Breath (9)	
AGE25	.22	.55**	-1.66	-1.57	.01	.11	-.20	-.23
	(.19)	(.24)	(1.30)	(1.43)	(.21)	(.23)	(.24)	(.27)
AGE55	-.03	-.37	-1.07	-1.48	.31	.26	.15	.15
	(.22)	(.27)	(1.67)	(1.75)	(.24)	(.25)	(.26)	(.28)
TENURE		.01		.01		.01		-.01
		(.01)		(.09)		(.01)		(.01)
UNION		.59**		-.03		.56**		.19
		(.19)		(1.25)		(.18)		(.21)
FEMALE		-.56**		-.99		.50**		.55**
		(.19)		(1.32)		(.20)		(.22)
FRSIZE		.00004		.001		-.0001		-.0002*
		(.0001)		(.001)		(.0001)		(.0001)
Industry Controls		xx		xx		xx		xx
Occupation Controls		xx		xx		xx		xx
Log:	-532.44	-532.44			-452.43	-452.43	-383.34	-383.34
Chi:	1.5	197.8	(R^2 =	(R^2 =	1.6	22.2	1.26	28.4
	(2)	(14)	.002)	0.02)	(2)	(14)	(2)	(14)

Table 6. Continued
Age and Other Determinants of Job Satisfaction, Productivity and Health
(standard errors in parens)

	Back (10)		Circulation (11)		Musc/Skel (12)		Nerves (13)		Respiratory (14)	
AGE25	.04	.09	LIMIT	LIMIT	-.22	.07	.24	LIMIT	LIMIT	LIMIT
	(.19)	(.21)			(.65)	(.10)	(.59)			
AGE55	-.17	.04			1.09**	.62	-.75			
	(.22)	(.24)			(.48)	(1.19)	(1.05)			
TENURE		.01				.06*				
		(.01)				(.03)				
UNION		.34**				.10				
		(.17)				(.49)				
FEMALE		.51**				-.96				
		(.18)				(.66)				
FRSIZE		-.0001				-.0006				
		(.0001)				(.0004)				
Industry Controls		xx				xx				
Occupation Controls		xx				xx				
Log:	-515.76	-515.76			-103.91	-103.91	-77.70			
Chi:	.57	28.8			5.2	28.5	0.9			
	(2)	(14)			(2)	(14)	(2)			

Notes:
** $t \geq 1.96$
* $t \geq 1.65$ (<1.96)

Since most dependent variables are dichotomous, equations 1-6, 8-14 are estimated using multinomial Logit. A negative coefficient indicates that the explanatory variable reduces the probability of the outcome in question. "Log" indicates the log likelihood value for all explanatory variables but the constant term being significantly different from zero; the "Chi" term is the associated Chi square value for this hypothesis test (degrees of freedom are indicated in parentheses). A reported value of "Limit" indicates the Logit model did not converge due to too few cases in one category of the dependent variable. Since "Weeks Off" is a continuous dependent variable, equation 7 is estimated using linear regression. Here R^2 values are reported in lieu of Log values. A notation of "xx" signifies that these variables were also included in the model in question.

For each outcome variable we estimate both a simple model, which includes only age terms, and an extended model. The extended forumulation, in addition to controlling on age, also includes tenure, industry and occupation controls, and three additional variables: the worker's union status, gender, and firm size. The union variable serves to indicate the degree to which workers have input into and can alter their working conditions (Freeman and Medoff, 1984). A separate intercept for female respondents is included to determine whether sex differences mentioned in some of the studies above persist in multivariate analysis. Firm size is a proxy for the degree of supervision and monitoring at the workplace; workers at larger firms are probably less closely monitored (Parsons, 1980). The industry and occupation controls, while not of primary interest in their own right, are included to test the lifecycle hypothesis discussed above. (The Appendix Table lists definitions for explanatory variables employed.)

III. Findings

A. Job Satisfaction and Job Content Variables:

It will be recalled that the general finding from previous studies where other variables were not controlled, was that of a positive relationship between aging and overall satisfaction on the job. Less unanimity prevailed regarding specific job facet or content variables. We hypothesized that the "life cycle" hypothesis might explain this finding if the relationship between age and performance problems disappears when job characteristics

like occupation and industry are controlled. Another view, the "self selection" view, held that the postive age/satisfaction pattern should decline if tenure is controlled.

A first conclusion from the QES models is that aging has a surprisingly small effect on the available indicators of job satisfaction and job content outcomes when tested using conventional statistical tools (see columns 1-6 in Tables 5 and 6). When age alone is held constant, neither the age nor the age-squared term is individually significant for four of six outcomes, and in the two cases where age is significant it appears to be due to greater dissatisfaction among the young rather than among the old ("Fast Pace", "Pay Bad"). This surmise is confirmed in the "Fast Pace" model including binary age terms (Table 6), since here the coefficient on the older worker term is statistically negative indicating fewer instead of more complaints among older employees. In general, then, models which include only age terms tend to cast doubt on the notion that older workers are less satisfied with their jobs.

The overall insignificance of the estimated age effects in the simple models also implies that testing the life cycle and selection hypotheses by including additional controls like tenure and occupation/industry dummies will not provide evidence strongly supportive of the theories. In two cases, adding control variables does remove significance from the age terms, consistent with the life cycle view ("Pay Bad", "Fast Pace"). In two other cases, however, adding control variables increases rather than decreases the statistical significance of the younger worker age

effect wiithout altering the insignificant coefficient for the age55+ variable ("Danger", and "Contaminants").[11] Hence there is no evidence that older workers are less satisfied with their jobs after controlling on other factors, contradicting both hypotheses.

Focusing briefly on the statistical significance of the remaining explanatory variables in the job satisfaction equations, it is interesting to note that findings are robust irrespective of the way the age variables are modeled. Greater tenure reduces reports of overall dissatisfaction and with pay, but appears to increase workers' reports of fast paced work in both Tables 5 and 6. The union effect is surprisingly weak, attaining significance only in a single case ("Contaminants"). Women workers prove rather similar to men insofar as overall job dissatisfaction, though they do report somewhat more trouble with fast paced work and less difficulty with contaminants and dangerous jobs in both empirical formulations. Firmsize is negatively related to reports of low pay, but to no other variables. Industry and occupation terms are not consistently significant, nor do they display a coherent pattern across models.[12]

B. Worker Productivity and Health Variables:

It will be recalled that previous studies suggested that older workers are often as productive and are injured less

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[11]The extended model could not be estimated for one dependent variable, "Meaningless", due to too few cases of workers reporting positive responses to the survey question.

[12]Coefficient estimates for industry and occupation effects are available from the author on request.

frequently than younger ones, though the research has not determined whether age per se is the explanation for the negative age/job risk profile or rather whether the age variable might be reflecting a life cycle phenomenon. We test the hypothesis by controlling for occupation and industry. We also test the exposure hypothesis by controlling for tenure. Results appear in columns 7-14 of Tables 5 and 6.

For only one outcome variable, the evidence suggests that greater problems reported by older workers may, in fact, be due to lack of controls for other variables: this occurs for the variable "Musc./Skel", indicating the presence of muscular and skeletal problems limiting the worker's job performance. Specifically, the aging effect is statistically insignificant in the extended models of both Tables 5 and 6, whereas older workers had indicated significantly more problems along this dimension in the cross-tabulation of Table 4.

For the remainder of the outcome variables, there is very little evidence in support of a strong link between aging, job performance and health. In one model of the "Tired" outcome, where age and age-squared are employed, there is no change in statistically significant age coefficients irrespective of whether age effects alone are included, or whether the extended model is used (Table 5, column 8) . However this is true only in the first formulation, since age is never significant in the second model. In three cases the extended (and sometimes the simple) models could not be estimated due to small numbers of individuals responding that they had these problems ("Circulation", Nerves,

and "Respiratory"). For the remaining three variables ("Weeks Off", Breath", and Back"), the results are similar to those found above: generally, age effects are not statistically significant in either the simple or the extended models. Hence, one cannot conclude that aging has a negative effect on either the most objective measure used here ("Weeks Sick"), or on the more subjective reports of health problems and health limitations. Further, the findings also contradict both the life cycle and the exposure hypothesis, since age effects either grow stronger or remain insignificant when other factors are held constant.

Again a brief review of the other control variables is warranted. In contrast to the job satisfaction models, the controls prove to be more statistically significant on the whole. Union workers and those with long tenure have significantly more back problems, irrespective of the way in which age variables are modeled. Interestingly enough, women report more difficulties with being tired, breathing, and back trouble, even after holding constant on industry and occupation in which they are employed. Employees in larger firms report fewer problems with breathing, though firm size is not significant otherwise.[13]

C. Conclusions

New empirical evidence on the links between aging, job satisfaction, and job performance using QES data from a nationally representative survey of workers yields some surprises.

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[13]Again a listing of estimated industry and occupation effects is available from the author on request.

Statistical testing of previously reported age effects suggests that aging has only a small impact on overall job satisfaction outcomes. When specific measures of job content are evaluated, where age is significant it appears to be due to greater dissatisfaction among the young rather than among the old. These results cast doubt on previous reports of more job satisfaction among older workers. Employee reports of problems with job productivity and health limitations are more mixed. In the case of muscular and skeletal problems limiting the worker's job performance, the evidence suggests that greater difficulties reported by older workers in previous studies may be explained by researchers' inability to hold constant other variables. For the remainder of the outcome variables examined here, there is very little support for a link between aging, job performance and health. Indeed, we find no evidence that aging has a negative effect on either the most "objective" measure used here ("Weeks Sick"), or on the more subjective reports of health problems and health limitations.

Discussion

This analysis has explored the links between age, job performance and job satisfaction. Our goal was to determine how employee productivity and satisfaction changes with age, in order to help understand why older workers appear to be retiring earlier over time. The evidence shows that conventional wisdom may be correct: older workers are equally if not more healthy, satisfied

and productive employees than their younger counterparts. There is very little support for the contention that earlier retirement is the result of declines in job satisfaction and/or productivity.

It must be emphasized that the empirical research focuses only on workers, like all earlier studies on this topic. If some individuals leave the labor force as a result of workplace problems, the findings may understate older peoples' job performance and health limitations. It might be thought that an examination of retirees' health problems could provide an estimate of the extent to which people leave their jobs because of health and/or productivity considerations. However, retirees' reports of self-assessed health problems probably overstate the actual extent of poor health as a motive for retirement. (This evidence is discussed in Anderson and Burkhauser, 1985; Burtless, 1987; Fields and Mitchell, 1984; and Sammartino, 1987). As a result, selectivity bias due to workers droppping out of the labor force may not be as significant a problem as might be suspected. The QES survey used here does not permit analysis of this issue; a longitudinal survey following those who leave the labor force would be necessary to determine whether patterns of aging and health-related performance problems on the job look very different from those who leave their jobs.

A final point regarding the role of health and productivity in retirement decisions should be made. There is virtually no evidence that the national trend to early retirement over the last forty years noted at the outset of the paper is attributable to worsening health (Bailey, 1987). This conclusion suggests that

other explanations must be sought to explain the increasing prevalence of labor force withdrawal among relatively young workers -- those in their late 50's and early 60's. Recent economic research suggests that the growing prevalence and generosity of retirement income programs, both in the form of company pensions as well as Social Security, may be a more important source of the motivation for workers leaving their jobs early (Fields and Mitchell, 1984; Parsons, 1987).

Appendix Table

Control Variables Employed

Age Variables:		Mean or Percent
Age	= Age in years	36.9 yrs
Agesq	= Age * age	1534.3 yrs
Age25	= Age less than 25	19%
Age55	= Age 55 and over	13%
Other Control Variables:		
Tenure	= Number of years with present employer.	7.16 yrs
Frsize	= Number of employees at firm.	548 workers
Union	= 1 if worker belongs to a union or is covered by a union contract; 0 else.	34%
Female	= 1 if female; 0 else.	39%
Industry Variables:		
Agric/Construc. Ind.	= 1 if extractive or construction industry; 0 else (reference category).	8%
Manufacturing	= 1 if manufacturing industry; 0 else.	26%
Trans/Trade Ind.	= 1 if transport, communication, utilities or trade industry; 0 else.	26%
Services Ind.	= 1 if services industry; 0 else.	31%
Public Admin. Ind.	= 1 if public administration industry; 0 else.	9%
Occupation Variables:		
Professional/ Manager Occup.	= 1 if professional, technical, or manager occupation; 0 else (reference category).	28%
Service Occup.	= 1 if service occupation; 0 else.	13%
Clerical/Sales	= 1 if sales or clerical occupation; 0 else.	20%
Craft/Operative Occup.	= 1 if craft or operative occupation; 0 else.	34%
Labor Occup.	= 1 if laborer occupation; 0 else.	5%

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