THE SOCIAL, CULTURAL, AND ECONOMIC DIMENSIONS OF SOCIOECONOMIC STATUS, AND INVESTMENT IN HEALTH*

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ABSTRACT

Socioeconomic status (SES) is a broad concept that includes cultural, social, and economic dimensions. I examine whether race/ethnic and sex differences in exercise, a significant behavioral investment in health, result from the various forms of cultural, social, and economic capital that comprise SES. Data from the 1998 and 2000 waves of the Health and Retirement Study, a nationally representative sample of U.S. adults aged 51 and older, allows me to examine SES related changes in regular vigorous physical activity over a two year period. Although the cultural, social, and economic dimensions all predict future activity status, only differences in cultural and economic capital account for race/ethnic disparities in exercise. Further, even after controlling for the full array of socioeconomic factors, sex disparities in exercise persist. Future work that seeks to explain race/ethnic disparities in health must account for the diverse aspects of SES that shape health outcomes.

Future revisions in the coming months will: (1) further clarify the theoretical framework, (2) test whether interactions are significant for random sub-samples of the data, to ensure that they are not significant at chance or due to the large sample size, and (3) use a multinomial logistic regression to examine four categories including combinations of exercise status in 1998 and 2000 to further examine dynamic changes in exercise status over time.

Socioeconomic status (SES) has long-standing relationships with better health, lower morbidity, and lower risks of premature death (Rogers et al. 2000, 2003). Recent work suggests that SES is multidimensional, with higher levels of income, education, and net worth; diverse income portfolios; the absence of credit card debt; and home ownership each predict better health and lower risks of mortality (Bond Huie et al. 2003; Drentea and Lavrakas 2000; Krueger et al. 2003; Robert and House 1996; Smith and Kington 1997). But few studies specifically examine the detailed components of SES that lead to health outcomes. I examine the various forms of social, cultural, and economic capital that comprise SES, and whether they each have independent relationships with physical activity, an important indicator of behavioral investments in health.

Many theorists suggest that race/ethnic and sex differences in life chances from disparities in SES (Massey and Denton 1989; Wilson 1987; Link and Phelan 1995; Oliver and Shapiro 1995; Williams and Collins 1995). But empirical work provides inconclusive results. Although inequities in SES partially close health and mortality differentials between groups, persistent disparities remain (Bond Huie et al. 2003; Drentea and Lavrakas 2000). However, much of that work only controls for a few of the dimensions of SES that have been found to predict health outcomes.

The current work has two aims. First, I examine whether broad aspects of SES, including cultural, social, and economic capital, affect investments in health. Although much work suggests that SES is multidimensional, little work fully accounts for these dimensions when investigating health behaviors. Second, I aim to provide a more complete test of perspectives that suggest that disparities in SES drive race/ethnic and sex differentials in health, by more explicitly controlling for race/ethnic and sex differences in a diverse array of socioeconomic factors. Much

work theorizes that health inequities in the U.S. derive from disparities in SES, although research has been unable to fully close those disparities.

SOCIOECONOMIC STATUS AND INVESTMENT IN HEALTH

SES indicates a person's position in economic institutions including the work place, the market place, the occupational hierarchy, and the educational system.[1] Although related, each of these domains are distinct and may foster the production and accumulation of different types of capital (Becker 1975; Bourdieu 1986; Calhoun 2000; Coleman 1988; Portes 1998). Capital, in this context, is simply a set of social, cultural, or economic resources that individuals have at their disposal when acting in the world, and that they can use to influence their life chances (Weber 1947). For example, the workplace provides social capital in the form of relationships with co-workers, economic capital in the form of a paycheck, and cultural capital in the form of occupational status.

Further, although economic capital can clearly be measured in terms of "better" or "worse," with more dollars being better than fewer dollars across various contexts, social and cultural capital are less clear cut. Many theorists note a given form of cultural or social capital – such as a blue collar background or having a high paying job – may be advantageous in some settings, but a form of stigma or disadvantage in others (Bourdieu 1984; Goffman 1963). Diverse forms of capital may, thus, provide advantages or disadvantages in various areas of life, and depending on the outcome of interest, the possession of a given form of capital might be costly and could even lead to net losses rather than gains (Bourdieu 1984). Thus, even though an institution may provide many forms of capital, which may lead to advantages or disadvantages in other areas of social life, each type of capital remains relatively distinct in conceptual and even practical terms.

Health Capital

Economic, social, and cultural capital captured by SES may provide resources or tastes for investments in health. Some economists posit that health is a good that may be acquired through investments in healthy activities – such as exercising regularly, quitting smoking, drinking moderately, or seeking out high quality medical care – if individuals have the requisite resources (Grossman 1972, 1982; Muurinen 1982; Sickles and Taubman 1997). But individuals must have tastes or preferences for investments in health, in addition to economic resources (Nussbaum and Sen 1993; Sen 1992). Indeed, two individuals with similar economic resources may have different tastes for exercise, depending on their social situations and cultural contexts (Frolich et al. 2002). Thus, it is important to examine the various dimensions of social life by accounting for qualitative differences among and within forms of capital.

But a key conceptual problem limits much research on investments in health. Health capital perspectives, when used to model relationships between SES and health statuses cannot fully understand the mechanisms that lead individuals to behaviorally invest in their health. Health statuses – including mortality, morbidity, or disability – are somewhat random, as even cautious individuals may be killed in automobile accidents or have congenital or genetic predispositions toward illness or certain types of health problems. Indeed, those who receive an extra $1,000 per week cannot simply go to their doctors and purchase an extra "unit" of health, in order to forestall health problems. Instead, individuals generally must alter their behaviors to attain better health. Health behaviors are important because they capture individuals' intentions to behave in a way that may, intentionally or unintentionally, lead to better health (Blumer 1969; Gadamer 1996).[2] This is especially true for exercise, which is widely recognized among physicians and the lay-public to provide health benefits (Anderson et al. 2000; McGinnis et al.

2002).[3] Thus, I examine participation in regular vigorous physical activity to capture individuals' intentions to behave in ways that lead to better health.

Cultural Capital

Occupational background, a history of self-employment, and education are important sources of SES related cultural capital. Occupational background – including white and blue-collar occupations – may shape the leisure activities that people undertake. Blue collar or working class culture may foster a lifestyle that supports physically demanding work that often requires little education, entails rowdy evenings at the bar, and promotes interests in relatively vigorous sports including weight-lifting, football, or basketball (Ehrenreich 2001; Hamper 1991; Willis 1977). Generalization theory suggests that blue collar workers may seek out vigorous leisure activities that complement their physically demanding work, and may be very likely to exercise when not at work (Wu and Porell 2000). Conversely, white collar culture may foster preferences and provide support for better health, especially by limiting workers' exposure to occupational risks including physical pain or the absorption of potentially hazardous substances (Cropper 1977). Thus, compensation theory suggests that white collar work may support inactivity at work but exercise in one's spare time (Wu and Porell 2000).

Self-employment may foster values including personal motivation, self-discipline, and the ability to successfully cope with stress (Lewin-Epstein and Yuchtman-Yaar 1991). Those values may then confer health advantages to those who are successfully self-employed, as they might more likely undertake regular exercise or see doctors more regularly (Kruger et al. 2003).

Although education is a central factor when examining health behaviors, some question whether education is a form of economic capital, cultural capital, or both. Economic perspectives suggest that education is the preeminent form of human capital that indicates knowledge and

skills that leads to higher earnings in the future – thus functioning as economic capital (Becker 1975; Sickles and Taubman 1997). But cultural theories assert that education is an institutionalized form of cultural capital that may bring direct returns to various dimensions of life, outside of narrow economic concerns (Bourdieu 1986). Finally, some contend that education may work to provide better health through both economic resources *and* preferences for health lifestyles (Ross and Wu 1995).

Thus, education may be a form of economic capital to the extent that it provides skills and knowledge specific to increasing one's economic standing. As such, more education might lead to higher physical activity by providing individuals with the necessary economic resources. But education may function as a form of cultural capital to the extent that fosters preferences for healthy activities, net of economic factors. That is, education may provide a taste for healthy lifestyles, and may indicate more complete knowledge about the benefits of physical activity.

Social Capital

Retirement status, employment status, and job quality are all forms of social capital that derive from SES. Retirement is a major event in an older worker's life. Some theorists argue that retirement may provide a period of enforced inactivity, a decline in social integration, and generally greater levels of social and economic stress (Minkler 1981; Wheaton 1990). These factors might associate with worse health and lower levels of physical activity. But other theorists posit that, at least in recent years, retirement may signify financial success and the desire to have more time for leisure activities (Costa 1996; Hayward et al. 1989), including exercise.

Individuals with regular employment often experience better health, a finding known as the "healthy worker effect" (Monson 1986; Rogers et al. 2000; Sorlie and Rogot 1990), through

two mechanisms. First, contact with peers at the workplace may provide access to information about exercise – including the benefits of activity or insight on how to begin a fitness routine – and a network of exercise partners. Second, some companies may provide fitness equipment and instruction at the workplace, to encourage exercise. However, not all jobs may be conducive to fitness; work places that are stressful or that workers dislike may make for poor quality social capital (Grzywacz and Marks 2001; Wu and Porell 2000). High levels of work related stress or dissatisfaction may inhibit physical activity, should individuals find themselves too emotionally cognitively exhausted to exercise regularly.

Economic Capital

Economic dimensions of SES, including income, wealth, and diverse income and asset portfolios, may be important resources for promoting exercise. Income and wealth show persistent, graded, inverse associations with adverse health outcomes (Adler et al. 1994; Feinstein 1993). Higher levels of current income may provide immediate access to recreational facilities, private clubs, personal trainers, and other resources that may promote the initiation and maintenance of participation in regular physical activity. Higher income may also attenuate the barriers to activity due to poor health, such as inadequate equipment (Hirvensalo et al. 1998). Broader economic well-being, including home ownership, wealth, or net worth, may become an especially important component of economic well-being as individuals age and current income may understate accumulated earnings (Bond Huie et al. 2003; Ghez and Becker 1975; Land and Russell 1996; Robert and House 1994, 1996; Smith and Kington 1997). Should current earnings decrease as people age or should periodic economic shocks disrupt the flow of immediate income, those with higher levels of wealth should still be able to enjoy access to factors that facilitate beginning and maintaining regular physical activity.

Diverse income and asset portfolios may also be important resources for increasing investments in health. Income and asset portfolios may include various resources that derive from employment; business, farm, and home ownership; savings in the form of stocks, bonds, cash deposits, or interest bearing accounts; and pensions and retirement accounts (Smeeding and Weinberg 2001). More income and asset sources, net of the amount earned, may allow individuals to substitute one economic resource for another if one should dry up, thereby allowing them to maintain their health in times of need or fiscal insecurity (Krueger et al. 2003).

Race/Ethnic and Sex Differences in SES

Race/ethnic and sex disparities in socioeconomic status are well known. Compared to non-Hispanic whites and males, non-Hispanic blacks, Hispanics, and females often have different types of cultural capital. For example, non-Hispanic blacks and Hispanics tend to have lower levels of education, often because they grew-up in households with lower levels of income and wealth (Conley1999; Keister 2000; Oliver and Shapiro 1995). Lower levels of education may thus result in lower levels of income and wealth in later life as racial and ethnic minorities often take blue collar jobs that required lower levels of education. Concomitantly, especially in older cohorts, females often have less education than males because they were often less encouraged to matriculate, or to complete college if they entered (####). Lower levels of education and cultural pressures that encouraged white, middle-class women to remain out of the labor force, instead focusing on home and family care, further suppress the accumulation of wealth over women's life-cycles.

Especially in older cohorts, non-Hispanic blacks, Hispanics, and females might also be less likely to ever be self-employed, due to discrimination, difficulty in securing loans, or a lack of information about business and investment opportunities due to lower levels of education

(Blau and Graham 1990). Because education, employment, and self-employment are important factors in determining future health, income, and wealth trajectories, they may also impact the timing and reasons for retirement. Indeed, those with fewer economic and health resources may be less likely to retire (Hayward et al. 1989).

DATA AND METHODS

Data

I employ the 1998 and 2000 waves of the Health and Retirement Survey (HRS) to examine the effects of the cultural, social, and economic dimensions of SES on physical activity. The 1998 HRS provides a nationally representative sample of U.S. adults aged 51 and older, and over-samples blacks and Hispanics (SRC 2003a). The HRS collects extensive data on the social, economic, and health characteristics of aging individuals, and takes extensive measures to ensure that the data are accurate, the frequency of missing values is minimized, and that few individuals are lost to follow-up across waves. I then link the 1998 HRS to the 2000 HRS to assess exercise status two years into the future (SRC 2003b).

I take several steps to limit the cases dropped due to missing data. Because 77.5% of the individuals in the 1998 HRS were interviewed in prior waves, I can use responses from prior years to impute missing data, where logically appropriate.[4] Indeed, the HRS assumes that some data are time invariant, including the number of years of education.[5] Although some characteristics may change over time, data from prior waves provide more accurate insight into current values than might processes that generate more random error, including imputation with multiple regression. Because of the numerous measures the HRS took to limit missing data, and the availability of data from prior waves for many individuals, I dropped less than 0.25% of the sample for missing data on occupational status, exercise status in 1998 or 2000, and childhood

health status. Further, an additional 2,169 individuals, or 11%, were lost to follow-up in the 2000 HRS – 1,088 refused interviews and 1,081 that died.[5] After accounting for sample exclusions, 17,372 individuals remain for analysis.

Variables and Measurement

The dependent variable evaluates exercise status in 2000. This variable is dichotomous, and is coded as 1 to indicate individuals that have participated in vigorous physical activity or exercise three times a week or more, on average, over the last 12 months; with sedentary individuals coded as 0. Although the HRS does not ask about specific activities – for example, jogging, bicycling, swimming, or playing basketball – this variable is advantageous because it captures different sorts of exercise that individuals may undertake across various contexts and is a broad indicator of an active lifestyle. Further, this variable correlates positively with better self rated health in 2000 ($r = 0.286$; $p > 0.001$), suggesting that it aptly captures health related activities.

The independent variables come from the 1998 or earlier waves of the HRS. Sociodemographic factors include race/ethnicity, sex, age, and whether married or living with a partner. Race/ethnicity is coded categorically as non-Hispanic white (referent), non-Hispanic black, or Hispanic.[7, 8] Sex is coded dichotomously as male and female. The sample includes individuals aged 51 and older. These ages are ideal for this analysis as older individuals show persistent declines in physical activity, although most individuals could receive dramatic health benefits from regular vigorous activity. I also control for age as a linear term that ranges from 51 to 106, because levels of physical activity persistently declines with age.[9] Finally, couple status is coded dichotomously to assess whether individuals are married or living with a partner, or if they are single (referent). Because I simply want to control for couple status, and because

preliminary analyses suggest that married and cohabiting people show similar levels of exercise and there are no significant differences between divorced, widowed, or never married individuals, dichotomous coding works well.

The cultural capital variables include education, occupational background, and whether ever self-employed. I code education categorically, to capture any non-linear relationships between education and physical activity, as post-baccalaureate degree, any college or a four year degree, high school degree or equivalent, seven or more years of school but no high school degree, and six or fewer years of school (referent). Occupational background is coded categorically as blue collar (referent), white collar, and never in the labor force. The HRS provides occupational status codes from the Standard Occupational Classification Manual (U.S. Department of Commerce 1980), although the level of detail is limited so that individual respondents cannot be identified. Following Wu and Porell (2000), white collar background includes managerial, professional, technical, sales, and administrative support occupations; and blue-collar status indicates workers in labor, manufacturing, industry, farming, forestry, construction, mechanics, transportation, and production oriented tasks. Further, because the HRS asks respondents about their occupational statuses at various points in their life, I use data from questions that ask about their job title from the most recent job that they held for at least 5 years. But, the results are substantively identical when using data about their job title for their first major job or the job title that they held for the majority of their working lives. Finally, whether ever self-employed is coded dichotomously as self-employed at any point in one's life, or never self-employed (referent).

Social capital measures include retirement status, employment status, and work experience. Retirement status is coded as retired or not retired (referent). Employment status

compares those who are not working to those who are working (referent). Subjective work experience is coded into four categories, including those who enjoy their work and do not find it stressful, those who enjoy their work and find it stressful, those who dislike their work and do not find it stressful, and those who dislike their work and find it stressful (referent). Because subjective work experience is only applicable to those who are currently working, employment status functions as a "corner solution" (Krueger et al. 2003). That is, because the equation controls for employment status and subjective work experience, all individuals are compared to those who are currently working, but who dislike their job and find it stressful – the only excluded group. Thus, the employment status variable also captures the unobserved factors – including motivation or occult health conditions – that may associate with employment, but also the subject assessment of the work experience.

Measures of economic capital include net worth, household income, and an income and asset portfolio. Net worth is an apt indicator of wealth, measured as household assets minus debts, and is coded categorically into terciles. Household income is aggregated for all sources of income earned by the referent person and their spouse (if present), and is also coded into terciles. The income and asset portfolio measures the number of sources of income and assets available to a household. Individuals could have between 0 and 51 income or asset sources, although actual values ranged from 0 to 26, once including values for the respondent and his or her spouse or partner, if present. This variable is then coded categorically, into pentiles.[10, 11]

I also control for baseline health status to account for the ability and propensity of individuals to exercise. Exercise status in 1998 is dichotomous, and is measured identically to exercise status in 2000, the dependent variable. I control for functional ability and childhood health status to account for any health conditions that might hinder the ability of individuals to

exercise. Although even individuals in poor health might benefit from controlled physical activity (####), poor health may make exercise more difficult or may limit the types of activities that individuals can undertake. I code functional ability dichotomously to indicate if they have difficulty or are unable to jog or run for about a mile, walk several blocks, walk one block, sit for several hours, get up from a chair, climb several flights of stairs, climb one flight of stairs, stoop, kneel, or crouch, reach for things that are higher than shoulder level, push or pull large objects, or pick up a dime of a flat surface (referent); or if they have no limitations. Finally, self-reported childhood health status asks individuals to subjectively assess their health as a child on a five point scale that ranges from one (excellent) to five (poor).

Analyses

To examine the effects of social, economic, and cultural capital on physical activity, and to take advantage of the panel data provided by the HRS, I use logistic regression to predict physical activity in 2000 with covariates from 1998 or earlier (Pampel 2000). Because all models control for activity in 1998, the equations essentially predict the change in physical activity from one time period to the next (Ross and Wu 1995). Further, including activity status in 1998 ensures that the effects of the socioeconomic factors on exercise in 2000 are unbiased due to correlations with unobserved factors that associate with individual propensities to exercise. Indeed, the coefficient for activity status in 1998 is likely be upwardly biased, because it captures the effect of unobservable characteristics – including motivation, self-discipline, or interests in better health – that lead a person to exercise and that might correlate with SES. But because my interest is in whether covariates other than activity status in 1998 predict exercise behavior in 2000, this upward bias is not problematic. Further, by accounting for those unobserved factors, the modeling strategy provides stringent and conservative estimates for the effect of SES on

future physical activity. Concomitantly, this approach allows me to better capture causal relationships between SES and exercise, than would cross-sectional data.

I also control for work related physical activity whenever including employment status in the models. Physically demanding work is coded dichotomously as those who self-report that their job requires physical effort, lifting heavy loads, or crouching, kneeling, or stooping, most or all of the time, compared to those who have less physically demanding jobs (referent). The dependent variable does not differentiate between work and leisure related physical activity. But, compared to white collar workers, blue collar workers are more likely to be physically active in the work place (Cropper 1977; Porell and Wu 2000). Although some suggest that work related activity may enhance health (Cropper 1977), others describe it as "totally asymmetrical, brutally repetitive, and as likely to destroy the musculoskeletal structure as to strengthen it" (Ehrenreich 2001: 90), and find that it provides fewer health benefits than leisure activity (Anderson et al. 2000). Thus, I control for work related physical activity to more clearly examine the factors that lead to the potentially more beneficial leisure related exercise. Finally, I use Stata 8.0 software to correct the estimated coefficients and standard errors, because the HRS (SRC 2003c) uses a stratified, clustered, and unequal probability sampling frame (StataCorp 2003).

RESULTS

Table 6-1 presents descriptive statistics for the covariates, by race/ethnicity, sex, and for the full sample. Several important trends emerge. First, the distributions of the cultural capital variables vary considerably by race/ethnicity and sex. For example, non-Hispanic blacks, Hispanics, and females are less likely to have any college or post-baccalaureate degrees than are non-Hispanic whites and males, respectively. Indeed, although 9% of non-Hispanic whites have post-baccalaureate degrees, only 4% of non-Hispanic blacks and 2% of Hispanics have similar

levels of education. Further, 11% of males have post-baccalaureate degrees, compared to only 6% for females.

(Table 6-1 about here)

Second, there are also race/ethnic and sex differences in social capital. Non-Hispanic whites and males are both more often retired and more often in the labor force than are non-Hispanic blacks, Hispanics, and females, respectively. Conversely, among those who work, non-Hispanic blacks, Hispanics, and males more often have jobs that require physical effort than do non-Hispanic whites or females, respectively.

Third, the distributions of economic resources show a high degree of inequality among race/ethnic and sex groups. For example, 24% of non-Hispanic whites are in the highest pentile of income and asset possession, compared to only 3% of non-Hispanice blacks and Hispanics. Concomitantly, 24% of males are in the highest pentile, compared to 19% of females.

Although Table 6-1 establishes marked race/ethnic and sex differences for many of the socioeconomic variables in the analyses, Table 6-2 further suggests that those same factors are also associated with exercise status two years later. Multiple patterns arise in this table. First, larger percentages of non-Hispanic whites and males are exercising in 2000, compared to non-Hispanic blacks, Hispanics, or females, respectively – a pattern that mirrors national trends (U.S. DHHS 1996, 2000). Second, many of the socioeconomic factors are associated with physical activity. For example, larger percentages of individuals with higher levels of education, who are currently working, or who have the highest levels of net worth and income, exercise in 2000, compared to those with less education, who are not currently working, or who are less economically advantaged, respectively.

(Table 6-2 about here)

Table 6-3 presents the odds ratios from logistic regressions that regress exercise status in 2000 on the covariates in our analyses, to examine whether inequities in the cultural, social, and economic dimensions of SES close race/ethnic and sex differences in physical activity. Model 1 shows baseline race/ethnic and sex differences in physical activity in 2000, while controlling for basic sociodemographic and health factors. Net of age, couple status, and baseline health status, non-Hispanic blacks are 25% less likely, Hispanics are 20% less likely, and females are 22% less likely to exercise two years later than non-Hispanic whites or males, respectively. Models 2 through 8 further include the cultural, social, and economic dimensions of SES, first singly then jointly.

(Table 6-3 about here)

Model 2 finds that the cultural dimensions of SES close the activity gap between Hispanics and non-Hispanic whites, although significant differences remain for non-Hispanic blacks, and by sex. Further, higher levels of education associate with increased levels of activity two years into the future: those with post-baccalaureate degrees are 58% more likely, those with college degrees or any college education are 62% more likely, those with high school degrees are 49% more likely, and those with 7 or more years of education but no high school degree are 39% more likely to exercise in the year 2000, than are those with 6 years of schooling or less. But no differences emerge for individuals from different occupational backgrounds. Finally, those who have ever been self-employed are 18% more likely to exercise in the following two years, than are their never self-employed counterparts.

Model 3 finds that the social aspects of SES, although related to physical activity, do little to close race/ethnic and sex differences in exercise in 2000. For example, retired individuals are more likely to exercise in the future. Conversely, employment status has little effect on

exercise status net of work experience and work related physical activity. But there are substantial differences in activity among working individuals. Compared to those who dislike their work and find it stressful, those who enjoy their work and do not find it stressful are 50% more likely, those who enjoy their work and find it stressful are 35% more likely, and those who dislike their work and do not find it stressful are 14% more likely to exercise two years later. These relationships hold even after controlling for job-related physical activity.

Model 4 indicates that the economic dimensions of SES fully account for race/ethnic differences in physical activity, but leave sex differences largely unchanged. Although net worth and income appear unrelated to activity status in 2000, those with more income and asset sources exercise much more often than those with fewer resources. Indeed, compared to those in the lowest pentile, those in the second pentile are 25% more likely, those in the third and fourth pentiles are 48% more likely, and those in the highest pentile are 79% more likely to exercise, two years into the future.

Model 5 finds that the cultural and social aspects of SES, in combination, fully account for non-Hispanic White and Hispanic differences in exercise in 2000. But non-Hispanic blacks and females remain less likely to exercise than non-Hispanic whites and males, respectively. Model 6 shows that the cultural and economic aspects of SES fully account for any significant race/ethnic differences in physical activity, although sex disparities persist. Model 7 includes the social and economic dimensions of SES and finds that although Hispanic disparities in exercise close, non-Hispanic blacks and females remain much less likely to exercise than non-Hispanic whites and males, respectively. Further, the social aspects of SES appear to suppress the relationship between wealth and physical activity in 2000. After accounting for retirement and employment statuses, those in the highest tercile of wealth are 17% more likely to exercise in the

future than their less wealthy counterparts.[12]

In combination, several trends emerge from Models 1 through 7. First, both the cultural and economic dimensions of SES account for the lower odds of exercise among Hispanics, compared to non-Hispanic white. But, only the economic dimensions of SES account for lower odds of exercise among non-Hispanic blacks, relative to non-Hispanic whites. But, none of these factors close sex differentials in physical activity. Indeed, compared to females, males remain 16% more likely to exercise two years later, even in Model 8, which controls for all cultural, social, and economic factors simultaneously.

I further tested for interactions between each form of capital, to determine whether advantages in social, cultural, or economic capital augment advantages in other areas. However, only one interaction was significant, and it is presented in Model 9 and graphed in Figure 6-1. Indeed, as the figure shows, among individuals who are not currently working, there are no significant differences in exercise status in 2000 among those from blue collar or white collar backgrounds. But among those that are currently employed, those from white collar backgrounds are 20% less likely to exercise in the following two years than their blue collar counterparts. Significantly, this relationship holds net of work related physical effort.[13] This indicates that occupational status is only important among employed individuals, suggesting that blue collar workers receive advantages from working that white collar workers do not.

(Figure 6-1 about here)

CONCLUSION

These findings contribute to the literature in three ways. First, SES is much more multi-dimensional than previously documented. Although prior work has partially examined the effects of broad aspects of socioeconomic status – including income portfolios, wealth, home

ownership, or credit card debt – on health outcomes, no research has fully examined the social, cultural, and economic dimensions of SES presented here (Bond Huie et al. 2003; Drentea and Lavrakas 2000; Krueger et al. 2003; Robert and House 1996; Smith and Kington 1997). Indeed, the social, cultural, and economic dimensions of SES examined here all have persistent and independent relationships with future levels of physical activity, even after controlling for health status and exercise two years earlier.

Further, cultural and social capital work together, at least in one case, to foster physical activity. Indeed, interactions between occupational background and employment status show that, among currently working individuals, blue collar workers appear 20% more likely to exercise than their white collar counterparts. This supports generalization theory (Wu and Porell 2000): blue collar workers likely generalize their more vigorous work experiences into more active leisure lifestyles. However, this protective effect disappears upon leaving the labor force, suggesting that blue collar workers may have friends or employers who support more vigorous leisure activities, which white collar workers may not be able to access.

Second, different dimensions of SES close race/ethnic differences in physical activity. For example, both cultural and economic dimensions of SES explain exercise disparities between Hispanics and non-Hispanic whites. But only economic inequities account for non-Hispanic black and white differences in physical activity. Although social capital has persistent relationships with physical activity two years into the future, it does little to close race/ethnic differences in physical activity. Prior work has been unable to fully account for race/ethnic disparities in health outcomes with socioeconomic factors (Bond Huie et al. 2003; ####). My findings suggest that those persistent disparities may persist as prior studies incompletely control for other socioeconomic indicators. Nevertheless, this work could benefit by being extended to

other health outcomes, including self rated health, functional disability, or mortality.

Third, SES is largely unable to account for sex differences in exercise related investments in health. Despite differences in education, employment, retirement, income, and assets among men and women, those differences do not account for disparities in vigorous physical activity. This leaves open the question of what other dimensions of life, including household relationships, religion, or neighborhood factors might best account for sex differences in activity.

These findings derive from a sample of adults aged 51 and older. This age groups is ideal for examining socioeconomic disparities in health because at roughly ages 50 to 55, individuals reach their peak income earnings and asset holdings (Ghez and Becker 1975; Land and Russell 1996). Thus, among older individuals, education likely reflects true differences in preferences, as controls for income, net worth, and diverse earning portfolios relatively completely capture education differences in prior, current, and future income. Further, I have found important socioeconomic disparities in health among older adults. Others have found more limited relationships between health and SES at the older ages (House et al. 1990; Sorlie et al. 1995), despite the dramatic levels of economic inequality at the older ages (Crystal and Shea 1990). I find socioeconomic disparities in health that persist among late middle age and older individuals, likely because I use broad measures of socioeconomic status – a finding consistent with prior work (Krueger et al. 2003; Robert and House 1996).

In sum, research that fails to account for the multidimensional nature of SES may understate socioeconomic disparities in health. Further, those studying race/ethnic differences in health would be well advised to control for the full array of socioeconomic factors. To date, few studies have examined the relationships between income and asset portfolios, and wealth on health outcomes, despite the growing evidence of their importance.

ENDNOTES

[1] Marxist and neo-Marxist theorists, in contrast, might more often describe SES as indicative of class position (Mayer 1994; Wright 2000). But analyses of class often presuppose that individuals can be aggregated into a few major strata that fully describe their material power and position in society. Conversely, I follow Bourdieu (1984) who suggests that theories that reduce the social world to a handful of class dynamics may be somewhat misleading, as there are various distinct but interconnected spheres of social, cultural, and economic production.

[2] Future work, that employs ethnographic methods and symbolic interactionist theories, could better describe the various meanings that individuals associate with physical activity (Blumer 1969). For example, individuals may undertake exercise as a means to maintaining their health, spending time with their friends, relieving stress, or to maintain their physical appearance.

[3] Even as early as the middle of the 18th century, Benjamin Franklin (1914) described health benefits associated with eating moderately and exercising regularly, including fewer problems with gout, better digestion, increased vitality, and higher spirits.

[4] Not all individuals were previous interviewed; obviously I cannot use data from prior waves to impute values for their missing data. The 1998 HRS combines the individuals from the first HRS survey (born between 1931 and 1941) who were originally interviewed in 1992 and re-interviewed biennially, with respondents in the Assets and Health Dynamics among the Oldest-Old (AHEAD) survey (born in 1923 or before) who were previously interviewed in 1993 and 1995. But two new cohorts were also interviewed – those born between 1942 and 1947 and those born between 1924 and 1930 – to account for the missing age groups.

[5] Other questions, not used in this analysis, are also assumed by the HRS to be time invariant, including frequency of attendance at religious services, religious denomination, the subjective

importance of religion, and the amount of free time spent with one's spouse.

[6] I used a multinomial logistic regression to compare four possible outcomes in 2000, including sedentary, physically active, refused re-interview, and died. Compared to those who were inactive in 2000, non-Hispanic blacks and males had higher risks of refusing re-interview than non-Hispanic whites and females, respectively. Further, selective attrition among non-Hispanic blacks may artificially close non-Hispanic black and non-Hispanic white differences in physical activity. Appendix A shows the full results for the multinomial logistic regression.

[7] I exclude individuals from other race/ethnic groups because the HRS provides no additional detail on their background and because they could have very heterogeneous health and socioeconomic experiences. Indeed, combining diverse individuals into a single category, including Asians and Native Americans, provides little meaningful detail.

[8] Some literature finds that Hispanics, and especially immigrants, have better health than non-Hispanic blacks, even for the same level of socioeconomic status. But preliminary analyses that control for whether individuals speak a non-English language at home, to proxy for immigrant status, find no significant difference.

[9] Norms for physical activity may vary according to the cohort examined. But preliminary analyses that include dummy variables for four cohorts – those individuals born in 1923 or earlier, those born between 1924 and 1930 (children of the depression era), those born between 1931 and 1941, and those born between 1942 and 1947 (babies born during WWII) – find no significant cohort differences after controlling for age and socioeconomic status.

[10] Some sources that are measured in the portfolio include income from employment including wages, self-employment, or tips; assets including the value of first and second homes, farms or businesses, and stocks, bonds, and cash deposits, as well as income received from those assets;

retirement related income including pensions and social security; and retirement related assets such as individual retirement accounts.

[11] Kaufman et al. (1997, 1998) argue that residual confounding may bias estimates of the effect of SES on race/ethnic differences in health due to problems with categorization, incommensurate indicators, measurement error, and aggregation bias. I address their concerns in the following ways. First, categorical SES indicators may bias results if they mask significant racial variation within groups. But, extensive analyses (not shown) demonstrate that because of the highly skewed distributions of income, net worth, and the income and asset portfolio, categorical measures actually best account for race/ethnic differences in exercise. Second, the same variable may be incommensurate between groups if blacks and whites receive unequal benefits from the same indicator. I tested for interactions between all variables in the model and race/ethnicity and sex, and found no significant interactions. Third, measurement error may bias results if it varies systematically by race. The HRS uses a "bracket technique" to impute missing income and asset values, so that respondents who "don't know" or "refuse" to answer questions about their income or wealth are asked whether they fit into broader amount categories (see Smith 1995 for a detailed discussion of this technique). Individuals with missing income values are then given values within that bracket – this technique introduces less bias in the imputation process so that some researchers find the HRS estimates of wealth to be more reliable than those in other surveys (Moon and Juster 1995). Finally, aggregation bias might manifest if both individual and group level variables are independent predictors of the outcome of interest, but scholars include only aggregate measures. My results should not be affected by aggregation bias because we use individual level data. Although neighborhood level socioeconomic factors might independently impact racial differences in mortality, contextual analyses are beyond the scope of this paper.

[12] Separate analyses (not shown) indicate that higher levels of income predict increased physical activity, until controlling for net worth and income and asset portfolios.

[13] This relationship also holds after controlling for the number of hours spent working. Separate analyses (not shown) included an hours and hours-squared term. But because neither variable was significant, nor did they alter the other coefficients, I dropped them from the analyses.

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Table 6-1: Descriptive Statistics of Covariates, by Race/Ethnicity and Sex, HRS 1998-2000

	Non-Hispanic Whites	Non-Hispanic Blacks	Hispanics	Males	Females	Total
Sociodemographic Status						
Age (mean)	65.4	64.2	63.2	64.2	65.9	65.2
Couple						
Married or living with partner	68.9	45.0	64.7	79.6	56.2	66.5
Not-married or living with partner	31.1	55.0	35.3	20.4	43.8	33.5
Cultural Capital						
Education						
Postbaccalaureate	9.2	4.4	2.4	11.3	6.1	8.4
Some college	16.0	8.6	6.8	17.1	12.9	14.8
High school	38.2	29.0	19.8	32.8	38.9	36.2
7 years of school or more	35.0	45.9	35.1	33.8	37.7	35.9
6 years of school or less	1.6	12.1	35.9	5.0	4.4	4.7
Occupational Background						
Blue collar	44.6	64.6	66.2	55.6	41.4	47.7
White collar	50.2	27.9	22.3	42.7	49.6	46.5
Never in labor force	5.2	7.4	11.5	1.8	9.0	5.8
Ever Self Employed						
Yes	14.6	8.0	8.1	19.6	8.8	13.6
No	85.5	92.1	91.9	80.5	91.2	86.4
Social Capital						
Retirement Status						
Retired	42.9	39.3	28.0	46.8	37.6	41.6
Not retired	57.2	60.7	72.0	53.3	62.4	58.4
Employment Status						
Not working	54.8	59.3	57.4	46.1	62.6	55.4
Working	45.2	40.7	42.6	53.9	37.4	44.7
Subjective Work Experience						
Enjoy work, do not find it stressful	16.5	18.5	14.9	19.5	14.3	16.6
Enjoy work, find it stressful	21.9	14.9	22.2	25.0	18.3	21.3
Dislike work, do not find it stressful	3.9	3.4	2.1	4.4	3.2	3.8
Dislike work, find it stressful	2.9	3.9	3.3	4.9	1.5	3.0
Work Requires Physical Effort						
Yes	15.8	18.6	22.0	20.6	13.1	16.4
No	29.4	22.1	20.6	33.3	24.3	28.2
Economic Capital						
Net Worth						
Lowest tercile	25.9	67.5	62.4	28.7	34.3	31.8
Middle tercile	34.5	23.9	26.5	32.9	33.2	33.0
Highest tercile	39.6	8.6	11.0	38.4	32.5	35.1
Household Income						
Lowest tercile	26.4	55.6	60.0	21.7	38.4	31.0
Middle tercile	34.9	26.9	24.7	34.9	32.5	33.6
Highest tercile	38.7	17.5	15.3	43.4	29.1	35.4
Income and Asset Portfolio						
Lowest pentile	12.0	50.6	52.5	13.6	21.4	17.9
2nd pentile	16.4	22.2	21.1	17.1	17.3	17.2
3rd pentile	20.5	13.0	13.6	19.6	19.3	19.4
4th pentile	26.7	10.9	9.3	26.0	22.8	24.2
Highest pentile	24.4	3.2	3.6	23.7	19.3	21.2
Baseline Health Status						
Exercise Status in 1998						
Exercising	46.7	37.0	42.5	51.6	41.0	45.6
Sedentary	53.3	63.0	57.5	48.5	59.0	54.4
Functional Ability						
No ADLs	31.4	31.6	32.0	37.8	26.5	31.5
Any ADLs	68.6	68.4	68.1	62.2	73.5	68.5
Childhood Health (mean)	1.8	1.9	2.0	1.8	1.8	1.8

Source: 1998 and 2000 HRS, N=17,372

44 (0.25%) dropped due to missing values)

Note: All values are percentages unless noted as means

Table 6-2: Descriptive Statistics for Sample Covariates, by Exercise Status in 2000, HRS 1998-2000

	Exercise Status in 2000	
	Sedentary	Exercising
Sociodemographic Status		
Race/Ethnicity		
Non-Hispanic white	55.4	44.6
Non-Hispanic black	65.4	34.6
Hispanic	61.2	38.8
Sex		
Male	50.6	49.4
Female	61.4	38.7
Age (mean)	66.5	63.4
Couple		
Married or living with partner	64.6	35.4
Not-married or living with partner	52.6	47.4
Cultural Capital		
Education		
Postbaccalaureate	47.9	52.1
Some college	50.7	49.4
High school	55.9	44.1
7 years of school or more	59.7	40.3
6 years of school or less	73.1	26.9
Occupational Background		
Blue collar	58.5	41.5
White collar	53.6	46.4
Never in labor force	65.3	34.7
Ever Self Employed		
Yes	46.0	54.0
No	58.3	41.7
Social Capital		
Retirement Status		
Retired	59.5	40.5
Not retired	45.6	54.4
Employment Status		
Not working	64.0	36.0
Working	47.5	52.5
Subjective Work Experience		
Enjoy work, do not find it stressful	45.1	54.9
Enjoy work, find it stressful	47.4	52.6
Dislike work, do not find it stressful	53.1	46.9
Dislike work, find it stressful	54.5	45.5
Work Requires Physical Effort		
Yes	39.7	60.3
No	59.9	40.1
Economic Capital		
Net Worth		
Lowest tercile	64.8	35.2
Middle tercile	57.5	42.5
Highest tercile	48.3	51.7
Household Income		
Lowest tercile	67.9	32.1
Middle tercile	55.7	44.3
Highest tercile	47.6	52.4
Income and Asset Portfolio		
Lowest pentile	70.0	30.0
2nd pentile	61.4	38.6
3rd pentile	55.8	44.2
4th pentile	52.8	47.2
Highest pentile	46.5	53.6
Baseline Health Status		
Exercise Status in 1998		
Exercising	33.5	66.5
Sedentary	76.0	24.0
Functional Ability		
No ADLs	41.9	58.1
Any ADLs	63.4	36.6
Childhood Health (mean)	1.9	1.7

Source: 1998 and 2000 HRS, N=17,372

44 (0.25%) dropped due to missing values)

Note: All values are percentages unless noted as means

Table 6-3: Odds Ratios for the Cultural, Social, and Economic Effects of SES on Exercise Status in 2000, HRS 1998-2000

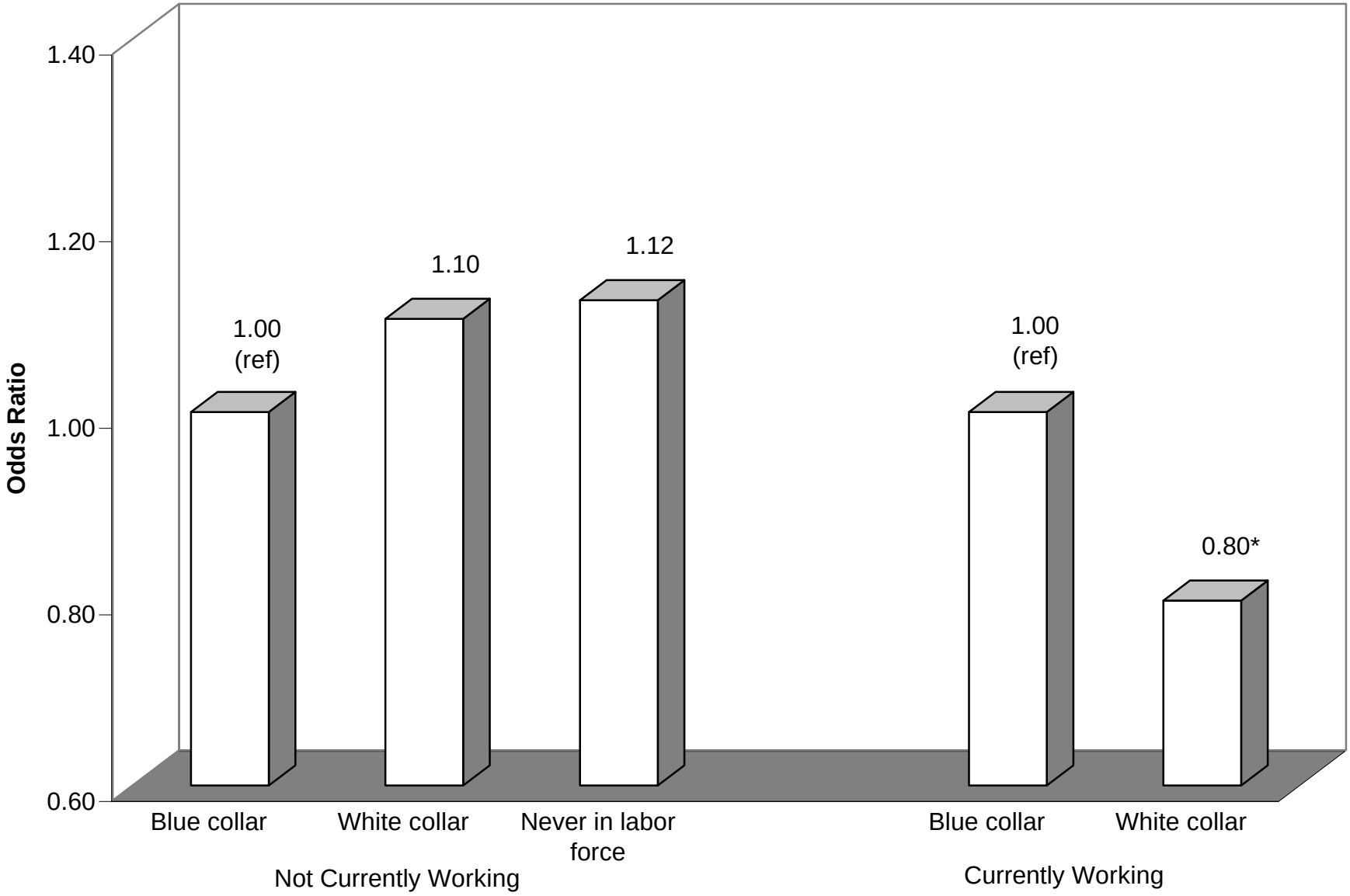
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Sociodemographic Status									
Race/Ethnicity									
Non-Hispanic white	ref	ref	ref	ref	ref	ref	ref	ref	ref
Non-Hispanic black	0.75*	0.80*	0.75*	0.90	0.79*	0.91	0.88*	0.90	0.90
Hispanic	0.79*	0.92	0.81*	0.98	0.92	1.04	0.96	1.03	1.02
Sex (1=Male)	1.22*	1.19*	1.14*	1.23*	1.14*	1.20*	1.16*	1.16*	1.15*
Age	0.98*	0.98*	0.98*	0.98*	0.98*	0.98*	0.98*	0.98*	0.98*
Couple (1=married or living with partner)	1.22*	1.21*	1.24*	1.04	1.23*	1.05	1.07	1.08	1.07
Cultural Capital									
Education									
Postbaccalaureate		1.58*			1.56*	1.29*		1.30*	1.30*
Some college		1.62*			1.58*	1.35*		1.34*	1.33*
High school		1.49*			1.43*	1.31*		1.28*	1.25*
7 years of school or more		1.39*			1.36*	1.24*		1.23*	1.22*
6 years of school or less		ref			ref	ref		ref	ref
Occupational Background									
Blue collar		ref			ref	ref		ref	ref
White collar		0.98			1.00	0.92		0.95	0.80*
Never in labor force		0.91			1.08	0.90		1.06	1.12
Ever Self Employed		1.18*			1.10	1.12*		1.03	1.03
Social Capital									
Retirement Status (1=retired)			1.29*		1.28*		1.20*	1.21*	1.18*
Employment Status (1=not working)			1.09		1.12		1.11	1.11	0.94
Subjective Work Experience									
Enjoy work, do not find it stressful			1.50*		1.47*		1.41*	1.41*	1.45*
Enjoy work, find it stressful			1.35*		1.32*		1.26	1.27	1.33*
Dislike work, do not find it stressful			1.14*		1.12		1.08	1.08	1.13
Dislike work, find it stressful			ref		ref		ref	ref	ref
Work Requires Physical Effort (1=yes)			1.34*		1.38*		1.42*	1.41*	1.31*
Economic Capital									
Net Worth									
Lowest tercile				ref		ref	ref	ref	ref
Middle tercile				0.96		0.96	0.98	0.97	0.97
Highest tercile				1.12		1.11	1.17*	1.16*	1.16*
Household Income									
Lowest tercile				ref		ref	ref	ref	ref
Middle tercile				1.02		1.01	0.99	0.98	0.97
Highest tercile				0.95		0.94	0.93	0.92	0.92
Income and Asset Portfolio									
Lowest pentile				ref		ref	ref	ref	ref
2nd pentile				1.25*		1.24*	1.22*	1.21*	1.21*
3rd pentile				1.48*		1.45*	1.43*	1.41*	1.41*
4th pentile				1.48*		1.45*	1.42*	1.40*	1.40*
Highest pentile				1.79*		1.76*	1.70*	1.68*	1.68*
Interactions									
Occupational Background by Not Working									
Blue collar occupation by not working									ref
White collar occupation by not working									1.38*
Baseline Health Status									
Exercise Status in 1998 (1=exercise)	5.59*	5.38*	5.21*	5.29*	5.18*	5.26*	5.08*	5.07*	5.04*
Functional Ability (1=no ADLs)	1.63*	1.62*	1.61*	1.60*	1.60*	1.60*	1.58*	1.57*	1.58*
Childhood Health	0.95*	0.95*	0.94*	0.95*	1.59*	0.96*	0.96*	0.96	0.96
Log-Likelihood	-10,000	-9,981	-9,946	-9,941	-9,933	-9,932	-9,892	-9,888	-9,879

Source: 1998 and 2000 HRS, N=17,372

* = $p \leq 0.05$

44 (0.25%) dropped due to missing values)

Figure 6-1: Odds Ratios for the Effect of Interactions between Occupational and Employment Status on Exercise Status in 2000, U.S. Adults Aged 50 and Older



Source: 1998 and 2000 HRS
Note: Blue collar background is the referent for each status; * = $p \leq 0.05$

Appendix A: Relative Risk Ratios for the Effect SES on Attrition and Exercise Status in 2000, HRS 1998-2000

	Active vs. Inactive	Lost to Follow-Up vs. Inactive	Dead vs. Inactive
Sociodemographic Status			
Race/Ethnicity			
Non-Hispanic white	ref	ref	ref
Non-Hispanic black	0.89*	1.23*	1.00
Hispanic	1.04	1.24	0.50*
Sex (1=Male)	1.16*	1.31*	2.57*
Age	0.98*	0.99*	1.07*
Couple (1=married or living with partner)	1.09	1.16*	1.18
Cultural Capital			
Education			
Postbaccalaureate	1.31*	1.00	1.05
Some college	1.36*	1.43	0.94
High school	1.31*	1.48	1.00
7 years of school or more	1.27*	1.42	0.98
6 years of school or less	ref	ref	ref
Occupational Background			
Blue collar	ref	ref	ref
White collar	0.96	1.28*	0.96
Never in labor force	1.06	1.30	1.06
Ever Self Employed	1.01	1.07	1.02
Social Capital			
Retirement Status (1=retired)	1.21*	0.88	0.89
Employment Status (1=not working)	1.09	0.78	2.77*
Subjective Work Experience			
Enjoy work, do not find it stressful	1.40*	0.75	0.89
Enjoy work, find it stressful	1.27	0.82	1.07
Dislike work, do not find it stressful	1.06	0.74	0.54
Dislike work, find it stressful	ref	ref	ref
Work Requires Physical Effort (1=yes)	1.42*	1.31	0.94
Economic Capital			
Net Worth			
Lowest tercile	ref	ref	ref
Middle tercile	0.97	1.18	1.17
Highest tercile	1.15*	1.44*	1.14
Household Income			
Lowest tercile	ref	ref	ref
Middle tercile	0.99	0.68*	0.91
Highest tercile	0.93	0.71*	0.90
Income and Asset Portfolio			
Lowest pentile	ref	ref	ref
2nd pentile	1.21*	0.70*	0.66*
3rd pentile	1.40*	0.63*	0.63*
4th pentile	1.39*	0.47*	0.48*
Highest pentile	1.68*	0.45*	0.45*
Baseline Health Status			
Exercise Status in 1998 (1=exercise)	5.06*	2.06*	0.85
Functional Ability (1=no ADLs)	1.57*	1.37*	0.61*
Childhood Health	0.96	0.87*	0.97
Log-Likelihood	-17,070		

Source:1998 and 2000 HRS, N=19,541

Note: All models are relative to inactive individuals in 2000.

* = $p \leq 0.05$