

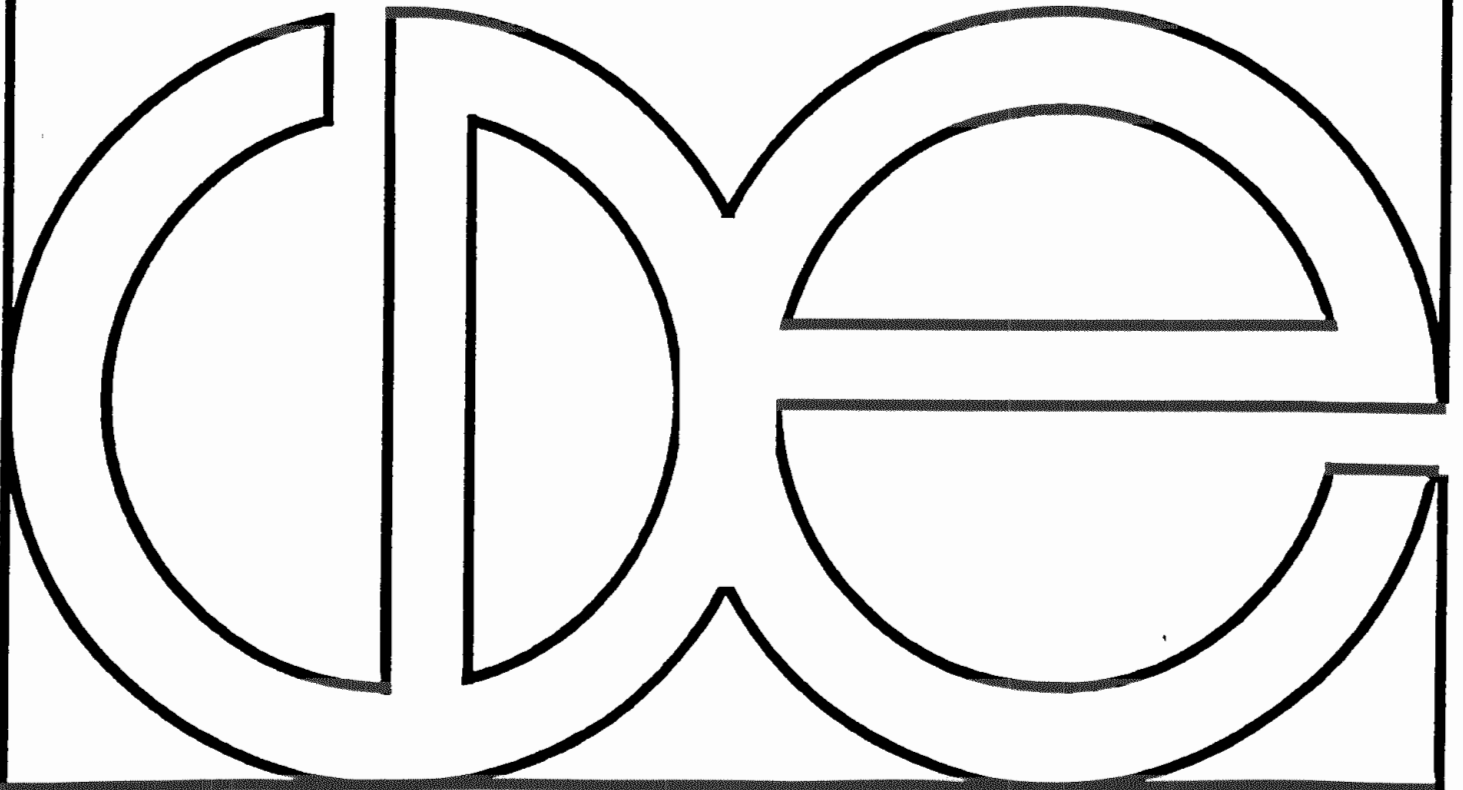
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**Socioeconomic Status, Gender, and Health at Midlife:
New Evidence from the Wisconsin Longitudinal Study**

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Socioeconomic Status, Gender and Health at Midlife:
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Socioeconomic status is a consistent predictor of morbidity and premature mortality and socioeconomic differentials in rates are largest in middle adulthood (Adler et al. 1993; Antonovsky 1967; House et al. 1990; Longino et al. 1989; Marmot, Kogevinas, and Elston 1987; Syme and Berkman 1976). Never before has the good health of all midlife adults been more in the public interest. For not only have we become increasingly aware of how both younger and older members of society depend on the middle generation for leadership and support (e.g., Brody 1990; Rossi and Rossi 1990), we are also beginning to understand that health at midlife is a good indicator of whether old age morbidity is likely to be compressed or lengthened in the wake of recent increases in life expectancy (House et al. 1990; Longino and Soldo 1987). With a more comprehensive national health care system in our likely future, health care costs will be even more widely shared by Americans as a public expense. It is now an increased economic as well as humanistic interest to embrace what House and his colleagues (1990:384) have termed "*the* fundamental agenda for research on aging and health," namely, "to understand whether and how morbidity and functional limitations or disability can be postponed into a briefer final phase of the finite, though perhaps not fixed, human life span."

One approach to understanding how morbidity might be compressed is to investigate differences between subgroups of the population that already exhibit briefer morbidity at older ages and those that begin to experience illness and functional limitations at relatively young ages. Since lower socioeconomic status persons experience a deterioration of health beginning at younger ages, socioeconomic strata at midlife

represent exactly such subgroups. Higher SES persons, in fact, appear to be the vanguard population embodiment of the compression of morbidity at increasingly older ages. Psychosocial factors are clearly implicated in whether some persons more "successfully — or, healthily — age" than others (Rowe and Kahn 1987; Rodin 1986). Better describing and understanding of the processes creating health differences between socioeconomic groups in middle age appears an obvious first necessary step toward developing social interventions that will eliminate or postpone the onset of chronic illnesses and disability until very late in the lifespan for a larger portion of the population (House et al. 1990).

Descriptions of socioeconomic differences in health are usually made utilizing one measure or another of socioeconomic status at a time — e.g., education, occupational status, or income. Doing this is often forced by the restriction of measures available. But doing such an analysis leaves unanswered the question, "What aspect of socioeconomic status is most implicated in the association? Is it mainly a financial issue, is it due to workplace hazards and stress, or is it something else?" Even disaggregating the effects of income, education, and socioeconomic status does not go so far as to give a complete picture of where to look for further proximate mechanisms of explanation, but it gets us further than only looking at one or another measure individually (Mechanic 1989; see also Kessler 1982, and McLeod and Kessler 1990, for similar arguments and use of the SES disaggregation approach in the case of psychological distress).

Another problem with many analyses is their restriction to cross-sectional data where the hypothesis that reverse causality is taking place — that is, health is causing a downward drift in socioeconomic status indicators — cannot be ruled out. Although this is less likely to be the case when education is the SES measure used, and enough

prospective studies have ruled out that this is the major way the association works (e.g., Haan et al. 1987), it is still a concern.

Gender differences in mortality and chronic illness rates are also consistently noted — with women advantaged in postponed mortality but disadvantaged in higher rates of chronic illness (see Verbrugge 1989 for a recent review). Women are also more likely to be found with lower household incomes, less occupational status, and, in older cohorts, somewhat less education than men, so there is a "feminization" of lower socioeconomic status to some extent. Although many analyses "control" for socioeconomic status when they look for gender effects, fewer analyses explore the interaction of gender and socioeconomic status in predicting health or mortality.

Given some of these gaps in our descriptive knowledge base, the goals of this study were to further the understanding of the social etiology of health at midlife by: 1) examining new longitudinal sample data to describe and disaggregate the association among three components of socioeconomic status — educational attainment, occupational status, and household income (measured at about age 36), and multiple dimensions of midlife health and health behaviors for men and women at about age 53, and 2) examining gender differences (including gender by socioeconomic status interactions) in health and health behaviors.

PREVIOUS THEORY AND RESEARCH

The literature establishing the SES and health relationship across the life course is quite extensive in epidemiology and outside of the United States; studies by American medical sociologists and life course researchers remain relatively uncommon (see House et al. 1990; Longino et al. 1989; and Preston and Taubman forthcoming, for noteworthy exceptions), partly due to the fact that only more recently have large-scale longitudinal

sociological studies of nonelderly persons begun to include more measures of physical health.

Dutton and Levine's recent review of the literature (1989) suggests the following generalizations can be made: The relationship of socioeconomic status with health is usually observed to be a *gradient* relationship — not a threshold effect, for example, of poverty versus nonpoverty. There are graded differences in health usually observed even between those at the very highest status and those in the status right below them, far from poverty and extreme deprivation (e.g., Marmot, Shipley, and Rose 1984; Marmot et al. 1991; Rose and Marmot 1981). These graded differences are observed across many countries, including those with national health care systems, helping rule out the hypothesis that health care access alone is the root of this differential in the United States (see, e.g., Townsend and Davidson 1982). Subjective and objective illness measures reveal roughly similar class gradients. It is not, therefore, something merely about response style creating this association. SES gradients in health occur for both sexes and at all ages. Inequalities in both health and economic status appear to be increasing (for the U.S., see Pappas et al. 1993). And different measures of socioeconomic status — for example, income, education, and occupational status — yield a roughly similar picture of health inequalities (although analyzing the individual components together is rare).

In middle adulthood, the incidence and prevalence of chronic conditions begins to increase for both men and women (Verbrugge 1989). During the years after age 40, strong negative gradient associations have been observed in mortality by all causes (Antonovsky 1967; Kitagawa and Hauser 1973) as well as cardiovascular outcomes (e.g., Marmot et al. 1984; Rose and Marmot 1981; Salonen 1982), and diseases such as arthritis, heart disease, ulcers, diabetes, high blood pressure, and chronic bronchitis both

in the United States (National Center for Health Statistics 1986) and several other nations (Haan, Kaplan, and Syme 1989). Even injury rates, which increase in middle adulthood, provide evidence of an SES gradient (Baker, O'Neill, and Karpf 1984).

Health behaviors are good indicators of future health status and have an important effect on whether morbidity and mortality will be postponed (Adler et al. 1993). Health behaviors are typically associated with socioeconomic status also — with more optimal behaviors usually occurring among members of higher status groups (Adler et al. 1993; Marmot et al. 1991; Matthews et al. 1989; Mechanic and Cleary 1980). However, in previous research, controlling for health behaviors has not eliminated the SES gradient in health (Salonen 1982; Haan, Kaplan, and Camacho 1987; Haan et al. 1989). A sociological approach to health behaviors would seek to investigate social structural influences and social psychological mechanisms leading to differences in health behaviors, rather than take these behaviors to reflect purely individual "choices" (Mechanic 1989; Mechanic and Cleary 1980; Williams 1990). This research project will take such an approach — investigating health behaviors in their own right as health outcomes and likely prospective indicators of future health.

DATA AND MEASURES

The data for this study come from the Wisconsin Longitudinal Study, which is a longitudinal representative sample study of 10,317 men and women who were first interviewed as seniors in Wisconsin high schools in 1957, and followed up in 1964, 1975, and most recently in 1992-93. The 1992-93 survey follow-up successfully interviewed 8,496 of 9,800 survivors of the original high school graduate sample (including as survivors 250 persons who could not be located in 1992-93), yielding a response rate of approximately 90 percent for the phone interview. Over 80 percent of those who

responded to the one-hour phone interview also mailed back a 20-page, self-administered questionnaire, which included most of the health outcome data. Response rate for the mailback data, therefore, is about 70 percent of the original living sample of respondents from 1957 (Hauser et al. 1994).

The WLS respondents must be seen as representing a relatively advantaged American sample population since they all completed high school in 1957, a time when about 25 percent of their Wisconsin birth cohort peers did not. They are almost all non-Hispanic whites, and have not had to face an additional burden of racial disadvantage. The population that the WLS graduate sample *does* represent, however — non-Hispanic high school graduates born around 1939-1940 — constitutes approximately 66% of the current American population (Kominski and Adams 1992).

Six outcome measures of health and health behaviors at about age 53 (prospective markers of health) were analyzed. First, subjective overall health is evaluated with answers to the question: "How would you rate your health — very poor, poor, fair, good, or excellent?" Based on responses, a dichotomous variable for fair to poor health (vs. good health) was created.

A measure of functional health limitations was created by including as limited all those respondents who answered that either 1) they had a physical or mental condition that limited the amount or kind of work they could do for pay, or 2) they indicated that a medical professional had said they had one or more of sixteen common health conditions — anemia, asthma, arthritis/rheumatism, bronchitis/emphysema, cancer, chronic liver trouble, diabetes, serious back trouble, heart trouble, high blood pressure, circulation (Duke 1978) — and that this illness or condition currently interfered a little or more with what they liked to do.

WLS respondents were also asked to indicate which of twenty-two common physical symptoms — lack of energy, trouble sleeping, fatigue/exhaustion, headache, visual problems, dizziness/faintness, numbness, ringing in ears, nausea, vomiting, upset stomach, constipation, diarrhea, urination problems, aching muscles, stiff/swollen joints, back pain/strain, chest pain, shortness of breath, excessive sweating, respiratory problems, skin problems (Duke 1978) — they had experienced in the last six months. They were further asked to rate on a four-point scale how much discomfort any indicated symptom had caused during the same period. Scores of discomfort were added up and a dichotomous variable was created differentiating those scoring in the highest quartile of discomfort from the rest of the sample.

A random sample of 80 percent of WLS phone interview respondents were asked questions about their drinking. (This is the only health outcome analyzed here that comes from phone interview data; the remainder come from the mailback questionnaire.) Those who indicated that they had more than five drinks *on one occasion* during the last month were differentiated as binge drinkers in contrast to all other persons.

Persons who indicated that they did *not* engage in vigorous physical exercise or sports — such as aerobics, running, swimming, bicycling, etc. — at least three times a week (the usual recommendation for maintenance of cardiovascular fitness) are contrasted with those who indicated that they did engage in such activity. And finally, a variable was also created differentiating current smokers and those who did not currently smoke.

Socioeconomic status measures were based on WLS respondent reports in 1975 at about age 36. The measure of education used is years of education completed, differentiating 1) those with only 12 years of high school education (the lowest attainment

for this sample), 2) those obtaining 13-15 years, and 3) those with 16 or more years of education.

Occupational status was measured using the Duncan Socioeconomic Index (SEI) (1970) rating of respondent reports of their current or last job at the time of the 1975 survey (when they were about 36 years old). None of the men and only 2 percent of the women had never worked as of 1975 and couldn't be coded on this variable; these cases were eliminated from the analyses. Occupational status was differentiated in to four quarters at the 25th, 50th, and 75th percentiles of the distribution.

Household income was determined by combining respondent and spouse income (if married) from all sources in 1974. About 5 percent of the mailback respondents in 1992-93 were 1975 nonrespondents and therefore did not have data from 1975 regarding 1974 household income. These 1975 nonrespondents as well as the handful of respondents from 1975 who were missing any information about income were excluded from these analyses. The income distribution, too, was differentiated into four quarters. Descriptive statistics for all analysis measures are included in the Appendix.

RESULTS

Logit regression models yielding maximum likelihood estimators with LIMDEP 6.0 (Greene 1992) were investigated for all of the dependent variables because all of the outcome measures were either inherently dichotomous or were constructed as dichotomous because of skewed distributions. Preliminary analyses of all the health outcomes revealed only one gender by socioeconomic status interaction effect; this occurred in the model for smoking. Therefore, for all of the outcomes except smoking, reduced models were subsequently estimated for both men and women together, without interaction effects; those estimates are reported here.

Differences in the likelihood of reporting fair or poor health are reported in Table 1. Women are marginally more likely to report poor health. Going no further than high school and even having some college are both more likely to be associated with poor health than having four years of college. Occupying a job in the lowest quarter of the occupational status hierarchy and having a low level of household income are also associated with significantly higher chances of reporting poor health, net of all other effects. Although not all contrasting categories are significantly different from the highest category in each case, an SES gradient is evident here, even for this relatively advantaged white sample. We do need to remember, too, when thinking about how we might generalize these and subsequent results to the national population, that an additional lower category of education, and possibly a distribution of occupational status and household income weighted somewhat lower is not being represented in these results — and that the omitted educational group from this sample (that is, those with less than a high school diploma) might well be expected to be doing at least as poorly as, or even more poorly than, the lowest group shown here.

In the case of functional limitations, women are found significantly more likely to report that they are to some degree functionally limited by a medical condition. This fits with what we know about the greater prevalence of chronic illnesses among women at middle age (Verbrugge 1989). Again, lower educational attainment, lower income, and lower occupational status each independently contribute to the greater likelihood of reporting some degree of functional impairment at age 53.

Similar analyses predicting the likelihood of being in the highest quarter of the sample in reports of symptom discomfort reveal women again as more likely to suffer greater pain and discomfort. Household income is the SES factor with the strongest

association with discomfort, and significant differences extend throughout the income gradient. Lowest occupational status, too, even net of income, approaches being a significant predictor. The net effects of education are nonsignificant.

Table 2 reports results for the measures of health behaviors — likely predictors of future health. The likelihood of heavy drinking (i.e., reports of having had more than five drinks on one occasion in the last 30 days) is much more common among men. Education appears to be the most important SES factor here — with both high school graduates and those with some college exhibiting more of a tendency to drink heavily than college graduates.

Women are significantly more likely not to exercise vigorously at least three times a week. The educational gradient is clear; income gradient differences are also important predictors of less exercise. This is a significant finding, since often only education (e.g., Matthews et al. 1989; Winkleby et al. 1990), and sometimes occupation (Marmot et al. 1991), are the only SES indicators used to look at differences in exercise. Yet different causal mechanisms may be implicated if we think about how income differences (for example, in access to health club and gym facilities) may play themselves out in contrast to educational differences.

Finally, the likelihood of currently being a smoker is reported separately for men and for women because of the previously noted significant gender by income interaction effect. Separate analyses for men and women yield an interesting story. For men, lower educational attainment predicts a greater likelihood of smoking. For women, lower educational attainment is also associated with a greater likelihood of smoking; however, higher income, net of education and occupational status, is associated with a *greater* likelihood of smoking than being at the median or below in family income. This result

illustrates again the importance of looking at multiple indicators of socioeconomic status, because previous research (e.g., Matthews et al. 1989) only observed the educational gradient for women and did not find the additional perplexing income effect (although Clausen (1987) also notes finding that very "competent" women in his Berkeley/Oakland studies had the most difficult time stopping smoking for some as yet unexplained reason).

DISCUSSION AND CONCLUSIONS

These analyses of the independent effects of gender, educational attainment, household income, and occupational status only begin to scratch the surface of telling the story of the relationship between socioeconomic status, gender, and health. However, they do confirm that even in a relatively advantaged sample of white Americans traversing their midlife years, gradient socioeconomic and gender differences in health and health behavior are evident. The SES and health association is *not* confined to health differences between the extremely disadvantaged and everyone else. Further, these analyses suggest that it is not simply one aspect of SES implicated in effects on health — each play a role, although the dominance of one or another factor often differs, depending upon the outcome examined. This should preclude our making a decision prematurely, based on evidence about limited outcomes — that examining one measure, namely education, may be sufficient (Winkleby et al. 1994).

From this evidence it would appear important for future research to pay attention to all three of the indicators of SES explored here — as well as to investigate others not included — e.g., spouse's occupational status (especially for women), the relative importance of individual earnings vs. earnings of other in the household, and family of origin measures. Additionally, other measures of wealth — e.g., home ownership and savings — may be important indicators of resources that reduce or buffer stress and allow

increased control over choices that can contribute to better health and maintained good health in midlife and older age (Rodin 1986; Rowe and Kahn 1987).

The gender differences found here — specifically, greater functional impairment, greater symptom discomfort, less vigorous exercising, and less heavy drinking among women — for the most part were not surprising given previous research. Close to half of the WLS women indicated some degree of functional impairment (see Appendix). If there are psychosocial factors implicated here that can be understood and applied to helping to reduce this figure for women as well as for men in their early fifties, they are certainly worthy of our further investigation. The one significant gender by SES interaction effect that found women with higher than median incomes smoking more than those with lower incomes also deserves additional attention.

The mechanisms by which gender and SES translates into these health outcomes and the differential propensity to engage in health behaviors have not been addressed here and certainly need to be pursued in future research. The story from these results is clear though — if we are interested in successful aging and compressing the period during which adults in the future experience health problems and functional impairment, we will pay attention to socioeconomic and gender differences in health, work to understand the mechanisms by which they occur, and endeavor to intervene to remediate differences wherever possible. It is much in the public interest — however defined — to do so.

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TABLE 1. Odds Ratios from Logit Regression Analyses for Effects of Education, Occupational Status, and Household Income on Self-Reported Fair to Poor Health, Functional Limitation, and Symptom Discomfort

	SELF-REPORTED FAIR TO POOR HEALTH (Age 53)		FUNCTIONAL LIMITATION (Age 53)		HI QUARTER SYMPTOM DISCOMFORT (Age 53)	
	Odds ratio	B/ se	Odds ratio	B/ se	Odds ratio	B/ se
FEMALE	.85	-2.0	1.25	4.3	1.88	10.3
EDUCATIONAL STATUS (Age 36)						
12 YEARS	1.75	4.4	1.20	2.4	1.16	1.7
13-15 YEARS (16 PLUS OMITTED)	1.36	1.9	1.16	1.6	1.16	1.4
OCCUPATIONAL STATUS (Age 36)						
LOW QUARTER	1.31	2.0	1.26	2.7	1.17	1.5
2ND QUARTER	1.10	.7	1.01	.1	.97	-.3
3RD QUARTER (HI OMITTED)	1.04	.3	1.07	.8	.96	-.5
HOUSEHOLD INCOME (Age 36)						
LOW QUARTER	1.54	3.6	1.26	3.2	1.43	4.3
2ND QUARTER	1.18	1.4	1.09	1.1	1.26	2.7
3RD QUARTER (HI OMITTED)	1.19	1.5	1.01	.1	1.18	2.0
VALID CASES	6431		6442		6442	

Source: Wisconsin Longitudinal Study (WLS) 1975, 1992-93.

Note: Analytic sample includes all 1975 respondents to the 1992-93 mail questionnaire who in 1975 were either employed or had ever been employed: 100% of men and 98% of women.

TABLE 2. Odds Ratios from Logit Regression Analyses for Effects of Education, Occupational Status, and Household Income on Binge Drinking, Exercising, and Cigarette Smoking

	BINGE DRINKER (Age 53)		NOT VIGOROUS EXERCISER (Age 53)		CURRENTLY SMOKE (MEN) (Age 53)		CURRENTLY SMOKE(WOMEN) (Age 53)	
	Odds ratio	B/ se	Odds ratio	B/ se	Odds ratio	B/ se	Odds ratio	B/ se
FEMALE	.26	-16.7	1.42	4.7				
EDUCATIONAL STATUS (Age 36)								
12 YEARS	1.90	5.8	1.97	6.9	1.87	4.4	2.23	4.7
13-15 YEARS (16 PLUS OMITTED)	1.84	4.6	1.56	3.7	1.69	3.1	2.47	4.6
OCC STATUS (Age 36)								
LOW QUARTER	1.04	.3	.95	-.4	1.31	1.8	1.02	.1
2ND QUARTER	1.17	1.3	.93	-.7	1.00	.0	.85	-1.0
3RD QUARTER (HI OMITTED)	1.23	1.8	.94	-.6	1.22	1.4	.91	-.5
HOUSEHOLD INCOME (Age 36)								
LOW QUARTER	.81	-1.9	1.47	3.7	1.10	.6	.79	-1.9
2ND QUARTER	1.10	.9	1.62	4.6	1.22	1.4	.70	-2.6
3RD QUARTER (HI OMITTED)	1.10	.9	1.21	2.0	1.03	.2	.89	-.9
VALID CASES	5382		6270		2949		3368	

Source: Wisconsin Longitudinal Study (WLS) 1975, 1992-93.

Note: Analytic sample includes all 1975 respondents who in 1975 were either employed or had ever been employed: 100% of men and 98% of women. The sample for exercise and smoking includes all 1975 respondents to the 1992-93 mail questionnaire. The sample for binge drinking includes a random 80 percent subsample of 1975 respondents to the 1992-93 phone interview.

APPENDIX

Descriptive Statistics for Analysis Variables

	TOTAL SAMPLE ^a N=6442	WOMEN ^a N=3328	MEN ^a N=2879
VARIABLE	MEAN (S.D.) ^b	MEAN (S.D.) ^b	MEAN (S.D.) ^b
Fair/poor health	.11	.11	.11
Functional limitation	.44	.47	.41
High quarter discomfort	.26	.31	.19
Binge drinker ^a	.18	.10	.28
Not vigorous exerciser	.85	.88	.82
Current smoker	.17	.18	.17
Female	.54		
12 yrs education	.62	.68	.54
13-15 yrs education	.13	.12	.14
16 plus yrs education	.25	.19	.32
Respondent's 1975 occupational SEI	487 (222)	459 (197)	518 (243)
1974 household income	16596 (11231)	15540 (10801)	17807 (11569)

Source: Wisconsin Longitudinal Study (WLS) 1975, 1992-93.

^a These sample sizes are for 1992-93 mailback survey respondents. All analyses except those done for binge drinking used mailback survey respondents only. Data on drinking come from a random 80% subsample of phone interview respondents: total sample N=5382; women N=2808; men N=2574.

^b Means for categorical variables are proportions.

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