CHAPTER TWO

Sex Differences in Health over the Course of Midlife

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Of the many issues studied in MIDUS, health is perhaps the area in which the most is already known. There are local and regional studies, cross-sectional and longitudinal epidemiological investigations, and many specialized studies that have attempted to characterize the determinants, correlates, and consequences of different health states. One of the many ways in which the MIDUS study is unique, however, is that it collected a rich array of health status indicators, measures of health behavior, and health attitudes in the same survey in which a wealth of psychological and social information also was collected. MIDUS is a cross-sectional study, so its data do not allow us to study change in individuals. Nevertheless, the rich array of information from different age groups allows us to characterize age differences in ways previously not possible.

Although there are many questions one might ask about the determinants and consequences of health status, medical and social scientists often have been particularly interested in how health varies over the life course and in gender and socioeconomic differences in health (Fremont and Bird 2000). In chapter 3, Marmot and Fuhrer explore socioeconomic gradients in some of the MIDUS measures and the ways those differences vary over the life course. In this chapter, we focus on the relationship between age and the different indicators of self-reported health measured in MIDUS, and assess whether and how those age differences differ by sex.

There are well-established biological differences between the genders that have different implications at different points in the life course, as well as theories about psychosocial factors that help explain either the prevalence or reported prevalence of different conditions (Cleary 1987; Doyal 2001; McDonough and Walters 2001; Verbrugge 1985; Waldron 1983, 1997; Walters, McDonough, and Strohschein 2002; Wenger, Speroff, and Packard 1993). For example, there has been extensive research on the development of cardiovascular disease in men and women (Nikiforov and Mamaev 1998; Waldron 1993) and the possible biological differences that explain the development of disease at different ages (Wenger,

Speroff, and Packard 1993). There also has been work on how psychosocial factors such as social roles and stress are related to differences in the way men and women perceive and react to different situations (Cleary 1987; Verbrugge 1985). There are no physiological measures linked to MIDUS. Thus, these data cannot explicate biological explanations of these differences. It is possible, however, to use psychosocial measures to illustrate some of the factors underlying the differences presented.

One factor that is important to consider when examining self-reported health, and specifically age and gender differences in health reports, is that different groups of respondents may have systematically different propensities to report certain states or conditions. One characteristic that has been shown in numerous studies to be related to experience and reports of health problems is somatosensory amplification. Somatosensory amplification is a term we use to describe sensitivity to, and/or increased reporting of, minor somatic and visceral sensations that are not generally regarded as symptomatic of serious disease. In this chapter, we assess how somatosensory amplification is related to age and gender differences in reports about health status. Because MIDUS also included measures of other psychological variables that might be related to reports about health, we also examined the extent to which the associations between amplification and health reports were similar to and/or explained by the relationship between such variables and reports about health status. In addition, we examined age and sex differences in effort devoted to health over the life course.

CONCEPTUAL FRAMEWORK

Researchers and policy makers now recognize that traditional outcome measures such as physiologic function and mortality do not adequately reflect the variations in health that are important to individuals (Brook, McGlynn, and Cleary 1996; McDowell and Newell 1996; Patrick and Erickson 1993; Tsevat et al. 1994; Wilson and Cleary 1995). Thus, there is increasing emphasis on assessing a broader range of health indicators that reflect what often is referred to as health-related quality of life (HRQL).

HRQL refers to the various aspects of a person's life that are affected strongly by changes in health status (health-related) and that are important to the person. It is affected by symptoms as well as physical, social, role, and sexual functioning and mental health.

It is important to make a distinction between HRQL and the broader concept of quality of life. The latter encompasses much more than health

(Andrews and Withey 1976; Berg, Hallauer, and Berk 1976; Flanagan 1978; Patrick and Erickson 1993). Economic, political, cultural, and spiritual factors, as well as health, can affect overall quality of life. In this chapter, we address the narrower concept of HRQL. The terms *health status* and *health-related quality of life* can refer to slightly different concepts (Guyatt, Feeny, and Patrick 1991; Guyatt, Patrick, and Feeny 1991), but in this chapter we use the terms interchangeably.

To help select and decide how to use the HRQL measures in MIDUS to examine sex differences across the life course, we use a theoretical framework developed by Wilson and Cleary (1995). In this model, measures of health can be thought of as existing on a continuum of increasing biologic, social, and psychological complexity. At one end of the continuum are biologic measures such as serum albumin levels and hematocrit, and at the other end are more complex and integrated measures such as physical functioning and overall health perceptions. These relationships are displayed schematically in figure 1. We describe the variables we used in our analyses below in terms of this model.

Symptoms

In MIDUS, there are no direct measures of physiological factors, but we do have some self-report measures, such as body mass index and waist-hip ratio. After biologic and physiologic factors, symptom status is the next level in our model. Physical symptoms have been defined as "a perception, feeling, or even belief about the state of our body" (Pennebaker
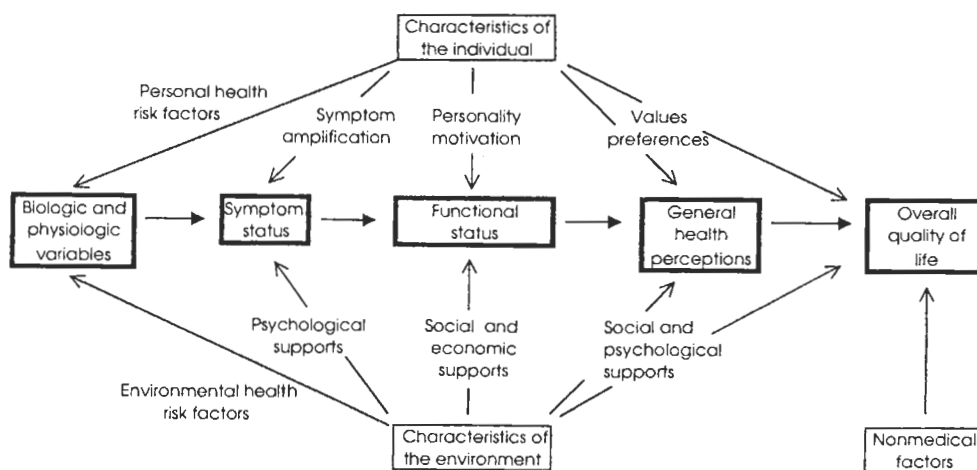

FIGURE 1. Relationships among measures of patient outcome in a health-related quality-of-life conceptual model. *Source:* Adapted from Cleary and Wilson 1995.

1982). We define a symptom as a person's perception of an abnormal physical, emotional, or cognitive state. Symptoms are assessed at the level of the organism as opposed to the level of specific cells or organs. Examples of physical symptoms are fever, nausea, pain, and fatigue; examples of emotional symptoms are feeling anxious and depressed. These are the feelings and experiences that a person typically describes to a physician. Symptom reports are influenced by complicated interactions of biologic, physiologic, and emotional factors. Also influencing the report of symptoms is the way in which the individual reacts to and processes bodily sensations—a factor difficult to measure, which probably varies greatly from person to person and is unlikely to be changed by an intervention by a physician or health care system (Barsky, Cleary, and Klerman 1992). For example, a concept called somatosensory amplification has been shown to be important in how people detect, interpret, and respond to physiological sensations (Barsky, Brener, et al. 1995; Barsky, Cleary, Brener, et al. 1993; Barsky, Cleary, et al. 1995; Barsky, Cleary, Sarnie, et al. 1993; Barsky et al. 1994). The way physicians label symptoms also can affect how individuals interpret and react to them. For example, the same symptoms may have very different consequences if they are labeled "flu" than if they are labeled "pneumonia." Thus, reported symptoms represent an integration of a large quantity of complex information, the source of which is typically the patient.

Less clearly conceptualized are emotional or psychological symptoms such as fear, worry, and frustration. Emotions and physical symptoms often vary together, and causal relationships clearly can go in both directions between these two types of symptoms (Mechanic, Cleary, and Greenley 1982; Pennebaker 1982). To include all of these different phenomena, we define a symptom as a person's perception of an abnormal physical, emotional, or cognitive state.

Functioning

The next level in our model is functional status, and like symptom status, it is an important point of integration. Among the determinants of functional status are symptom state, social factors, and psychological characteristics. Many aspects of an individual's social environment may have an important effect on his or her HRQL. In addition, individual factors such as personality and motivation are likely to be important determinants of functioning (Greenfield and Nelson 1992; Patrick 1987). A number of studies have included both clinical and functional status measures among the outcomes examined (Ayanian, Guadagnoli, and

Cleary 1995; Bombardier and Raboud 1991; Cleary et al. 1991, 1993; Laupacis, Wong, and Churchill 1991). These studies, many of which are clinical trials, demonstrate convincingly that measures of HRQL can be as sensitive to clinically important changes as are traditional clinical variables.

Health Perception

An individual's overall health perception or HRQL is a function of the importance or weight that the individual gives to various functional impairments. A construction worker or a dancer might value physical function highly and social function significantly less so. A teacher might value cognitive function much more heavily than physical function. Until these preferences are measured for individuals or particular groups, our ability to interpret changes in overall health perceptions will be limited.

In the analyses presented herein, we present measures that are representative of general health perceptions, functional status (intermediate activities of daily living and disability), symptoms (e.g., dyspnea and angina), and some measures of physiological status (e.g., high blood pressure and body mass index).

Methods

The data reported here come from the National Survey of Midlife in the United States (MIDUS). A more complete description of the survey sample and procedures is provided in chapter 1 of this volume.

Measures

Many health status variables were assessed in the MIDUS study. One of the most commonly used measures of perceived health status is a simple question asking respondents to rate their health as excellent, very good, good, fair, or poor. This variable has been shown to have excellent construct validity, to be related to several health behaviors, and to be a strong predictor of subsequent mortality (Cleary 1997; Idler and Kasl 1991; Kaplan and Camacho 1983; Mossey and Shapiro 1982). One of the strengths of this measure is that it is a synthesis of many aspects of people's health (fig. 1). To provide a slightly more differentiated assessment in MIDUS, we created two questions—one referring specifically to physical health and the other to mental health.

Measures of functioning included number of days in the previous month the respondent was unable to work or perform normal activities,

the number of days in the past month the respondent had to cutback on work or regular activities, and the respondent's difficulties with intermediate activities of daily living. Major symptoms assessed included shortness of breath related to exertion (dyspnea) and chest pain reported on exertion (angina). Dyspnea and angina were measured using adaptations of the Rose questionnaire (Rose et al. 1982), which has been validated against electrocardiogram abnormalities and mortality (Rose 1965; Rose, McCartney, and Reid 1977). We also asked whether the respondent had heart disease confirmed by a physician or had had a heart attack, reported headache symptoms, regularly took blood pressure medication, and whether they currently or ever had cancer, or any one of twenty-nine other health conditions (table 1).

We also assessed waist–hip ratio (WHR) and body mass index (BMI). WHR is often used as a crude estimate of body fat distribution. A WHR below 0.8 for women and 0.9 for men has been defined as "normal" irrespective of what the BMI is (Ledoux et al. 1997). To assess WHR, we mailed subjects a measuring tape with their survey and provided instructions on how to measure their waist and hip to the nearest quarter inch. Using those reported values, we calculated WHR as the ratio of waist to hip measures.

BMI was calculated as mass measured in kilograms divided by the squared height measured in meters. Because some values of the constituent variables were implausible, we recoded heights above 84 inches, waist measurement below 20 inches, and hip measurement below 22 or above 75 to the respective cutoff value. In addition, any WHR that was greater than four standard deviations from the sex-specific mean was recoded to be a missing value. We used those BMI data to create a variable indicating whether the person was overweight, using National Center for Health Statistics definitions (U.S. Department of Health and Human Services 1998). For men, overweight was defined as BMI greater than 27.8 kilograms/meter^2. For women the threshold was 27.3 kilograms/meter^2. Health behaviors measured included use of vitamins and exercise.

In addition, we assessed several personal beliefs or attitudes related to health. These included the amount of effort devoted to maintaining health (health effort) and reported levels of somatosensory amplification (amplification). Somatosensory amplification was measured with a five-item scale that assesses sensitivity to somatic and visceral sensations that are uncomfortable but usually minor and not generally regarded as symptomatic of serious disease (e.g., "hunger contractions," "being too hot or cold"). The scale has a four-point ordinal response format and has

TABLE 1 Prevalence of Self-Reported Conditions for Men and Women

Condition	Prevalence		Odds Ratio (Female vs. Male)	
	Female	Male	Unadjusted	Adjusted for Amplification
Anxiety, depression and other emotional problems	0.251	0.146	1.955***	1.662***
Arthritis, rheumatism, bone joint	0.230	0.173	1.425***	1.313*
Stomach problems	0.223	0.167	1.430***	1.207*
Sciatica, lumbago, backache	0.215	0.192	1.151	1.083
Hypertension	0.181	0.190	0.948	0.865
Hay fever	0.173	0.154	1.149	1.089
Urinary/bladder problems	0.163	0.103	1.704***	1.515***
Asthma, bronchitis, emphysema	0.159	0.100	1.705***	1.584***
Chronic sleep problems	0.148	0.110	1.411***	1.188
Migraine headaches	0.145	0.063	2.529***	2.244***
Foot problems	0.137	0.098	1.472***	1.364***
Skin problems	0.110	0.115	0.954	0.867
Hemorrhoids	0.106	0.114	0.931	0.816
Teeth problems	0.103	0.092	1.129	1.017
Constipation	0.091	0.029	3.314***	2.858***
Gum/mouth problems	0.086	0.068	1.280*	1.206*
Thyroid disease	0.072	0.016	4.839***	4.656***
Diabetes	0.050	0.057	0.869	0.776
Ulcer	0.045	0.035	1.293	1.087
Other lung problems	0.039	0.037	1.054	0.906
Gall bladder	0.034	0.012·	2.888***	2.583***
Hernia	0.028	0.031	0.912	0.759
Multiple sclerosis, epilepsy, other neurological conditions	0.023	0.016	1.409	1.273
Lupus, other autoimmune disorders	0.019	0.005	3.451***	3.114**
Alcohol/drug problems	0.017	0.042	0.406***	0.351***
Varicose veins	0.016	0.009	1.722	1.440
Stroke	0.007	0.011	0.650	0.547
Tuberculosis	0.002	0.003	0.803	0.665
AIDS, HIV	0.002	0.003	0.667	0.555

*$p < 0.05$.   **$p < 0.01$.   ***$p < 0.001$.

been shown to have a test-retest reliability of 0.79 over a median interval of 74 days and an internal consistency (Cronbach's alpha) of .82 (Barsky, Brener, et al. 1995; Barsky, Cleary, Brener, et al. 1993; Barsky, Cleary, et al. 1995; Barsky, Cleary, Sarnie, et al. 1993; Barsky et al. 1994, 1988; Barsky and Wyshak 1990; Barsky, Wyshak, and Klerman 1990). Although we know a fair amount about the correlates of somatosensory amplification, there is debate about exactly what it represents. For example, it could be that persons who score high on this scale are more sensitive to

common physiological sensations. That is, it could be that they simply are better at detecting physiological symptoms. Alternately, it could be that they process physiological symptoms the same as others do (as the variable name implies) but that they interpret and respond to symptoms (amplify). One way we have tried to investigate this issue is to examine whether people who have high values on this scale are more or less aware of certain physiological events. Specifically, we have investigated the extent to which this variable is related to the accuracy of the detection of cardiac arrhythmias, which can be measured objectively. Our studies in that area (Barsky, Cleary, Brener, et al. 1993) suggest that persons high on the somatosensory amplification scale are not more accurate in reporting when they have cardiac arrhythmias. Our interpretation of these results is that the scale described a tendency to interpret and respond differently to physiological sensations rather than an inherent difference in physiological sensitivity. In this study we also used the MIDUS measures of neuroticism, depression, tendency to seek advice, and low perceived control to assess whether the tendency to report symptoms is related to these other personality characteristics and behavioral dispositions.

RESULTS

The means of responses to the self-reported global physical health question for men and women of different ages are shown in figure 2.
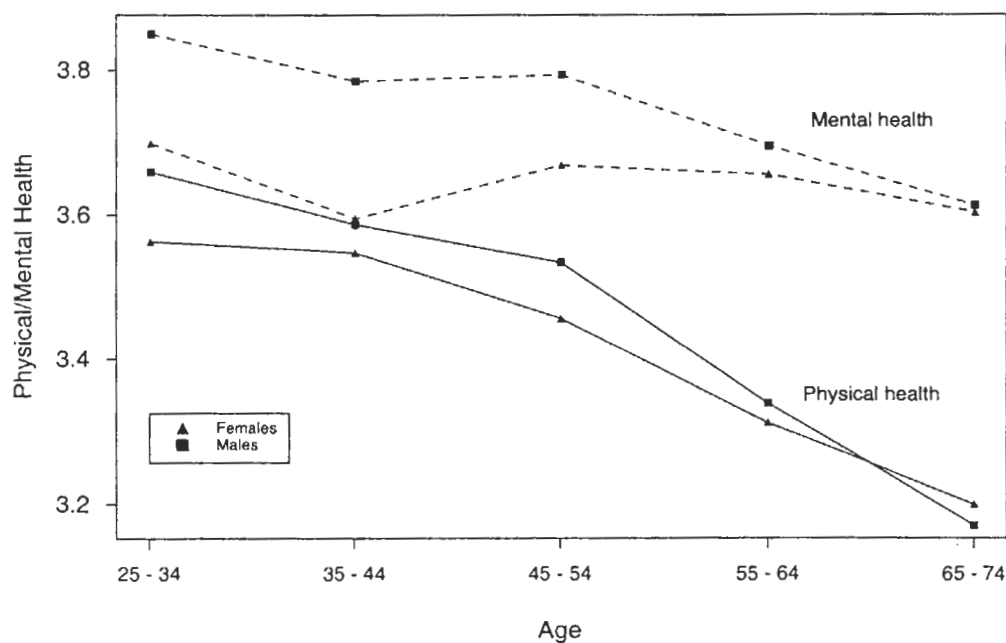

FIGURE 2. Self-assessed physical and mental health, on a scale of 1–5.

These data show that ratings of physical health become more negative over the midlife period in a relatively steady way, and that the age differences are similar for women and men, except that women tend to give a slightly lower rating for their physical health until they are older. The differences in general ratings of physical health between men and women and the differences in the change of these ratings over the life course are not statistically significant. Responses to the question about mental health show that although both men and women give higher ratings of mental health than physical health, women had significantly lower scores than men, with the lowest means being among women in the 35–44 age group. However, the differences in mental health ratings between men and women narrowed substantially after the age of 44. These findings are consistent with other studies showing that there are only small sex differences in overall ratings of physical health (Arber and Cooper 1999). They also are consistent with research showing that women tend to have much higher rates of affective disorders than do men and that these differences are most pronounced in their younger years (Kessler et al. 1993, 1994). Women also were more likely than men to report in the survey that they had anxiety, depression, or an emotional problem (table 1), and the differences were largest in the 35–44 age group (data not shown). However, the rates did not converge, as they did for self-assessed mental health.

Although simple questions about perceived health status provide a general sense of how individuals think they are doing, it is hard to interpret these measures because they reflect many different aspects of health. Another type of measure that provides a general indication of the general health status of individuals but that has a clearer interpretation is functional status. Figure 3 shows the age differences for a measure of problems with intermediate activities of daily living. These data are consistent with the data presented in figure 2 in that they show a steady increase of health problems over the ages studied, with women reporting more problems, on average, than men for all age groups.

Another way of assessing the short-term impact of health on functioning is to ask respondents how many days in the past month they were either unable to work or perform their regular activities, or had to cut back on their work or normal activities. Although these are usually asked as single questions in national surveys such as the National Health Interview Survey, we were interested in learning whether the respondent thought any reported disability was the result of physical problems, mental health problems, or a combination of the two. Furthermore, although these questions are intended to capture both work-related and
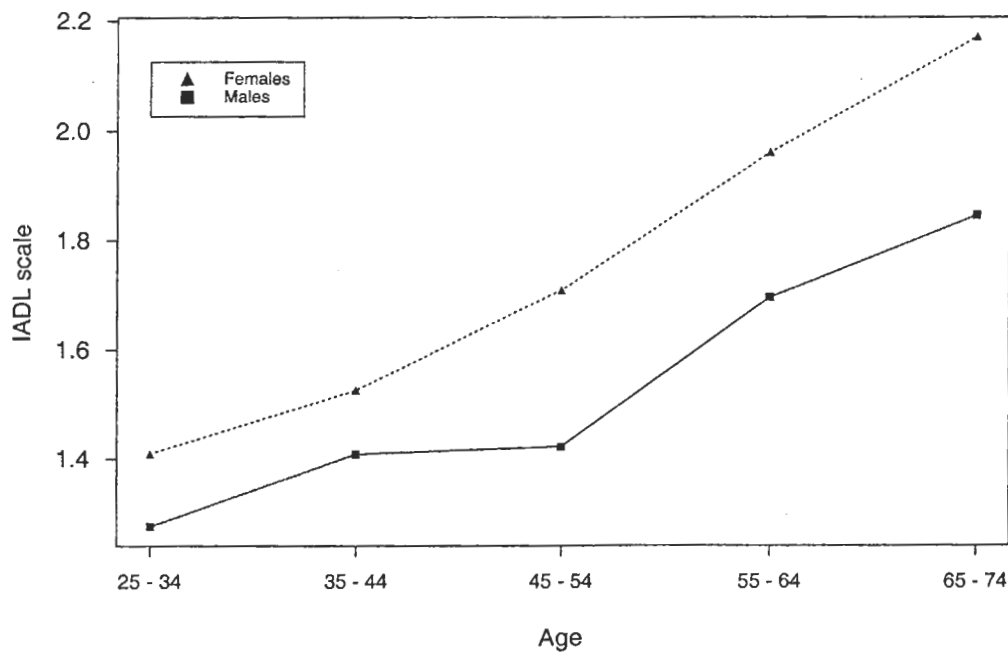
FIGURE 3. Problems with intermediate activities of daily living (IADL), on a scale of 0–4.

non-work-related disability, the interpretation of these questions depends on whether the person is working or not. Thus, we present data for each of these questions separately for those who report that they work at least part time outside the home and those who report that they do not work (figs. 4 and 5). These data reveal several striking patterns. First, for those not working, the group reporting the most days on which they were unable to perform, or had to cut back on normal activities, is women in the 45–54 age group. Most reported disability days are attributed to physical health problems by respondents, but women aged 45–54 tend to report that a higher proportion of disability days are the result of mental health problems. This is consistent with the data in figure 2 showing that women report worse mental health than do men and that these differences are more prominent in younger women. For those who report working, the pattern is quite different. Among these respondents we found less variation by age, except that fewer persons over the age of 65 report that they are unable to work because of health than do younger respondents, possibly reflecting better health states among people who choose to work after age 65. However, the gender differences are pronounced, especially for women between the ages of 25 and 54.

As indicated in figure 1, we consider symptoms and specific conditions the precursors or determinants of these more global outcomes.

Thus, to try to understand better the reasons underlying these age and gender differences in functioning, we examine a select set of more specific indicators. Two cardinal symptoms of cardiac disease that are related to functional status and general health status are dyspnea and angina. Dyspnea (fig. 6) shows a trend similar to that found for intermediate activities of daily living. Angina, however, shows a different pattern (fig. 7). For men there is a sharp increase in the prevalence of angina until about the age of 50, at which point the prevalence stops increasing. For women, on
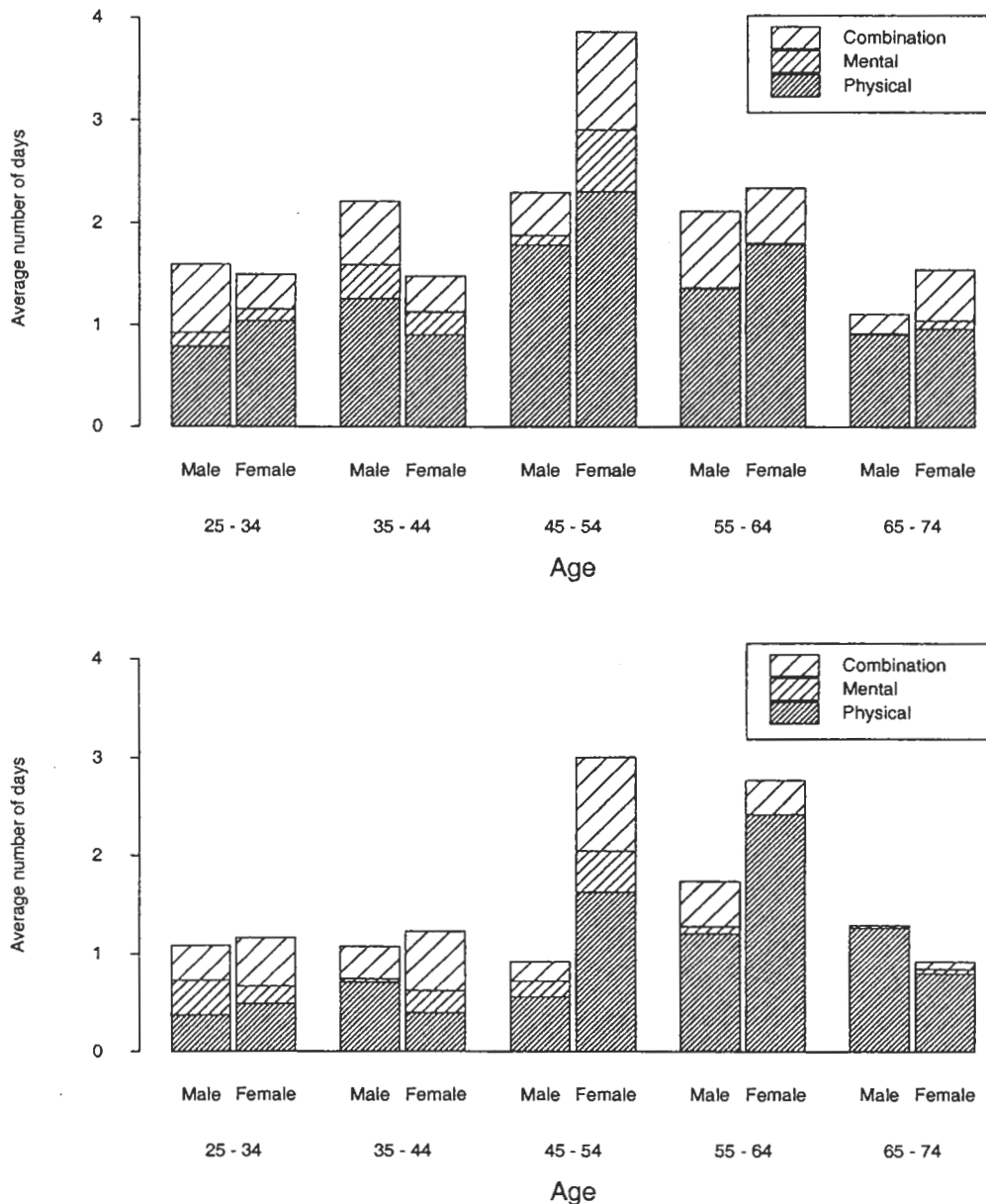
FIGURE 4. Days nonworkers were unable to carry out normal activities (top), and days nonworkers cut back on normal activities (bottom).
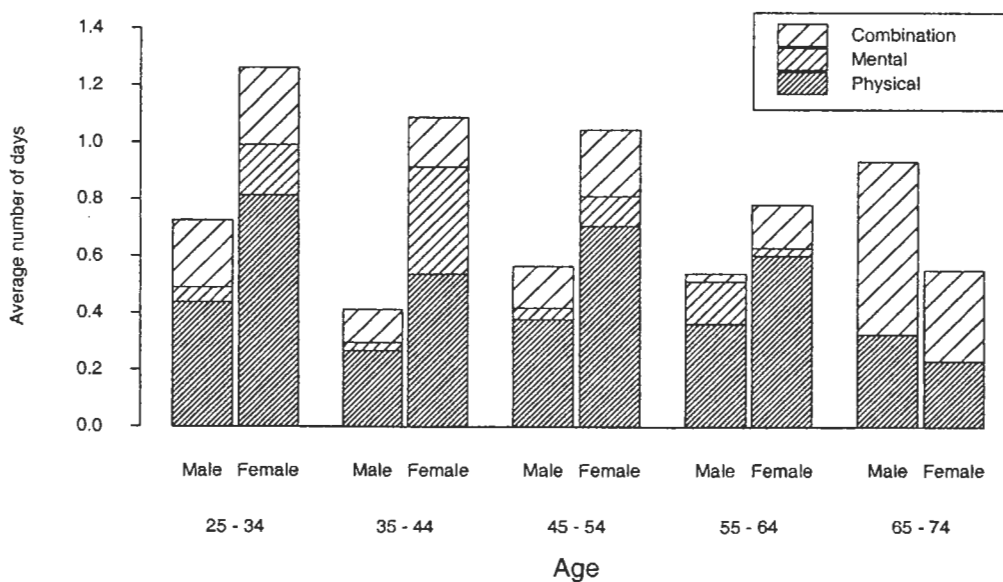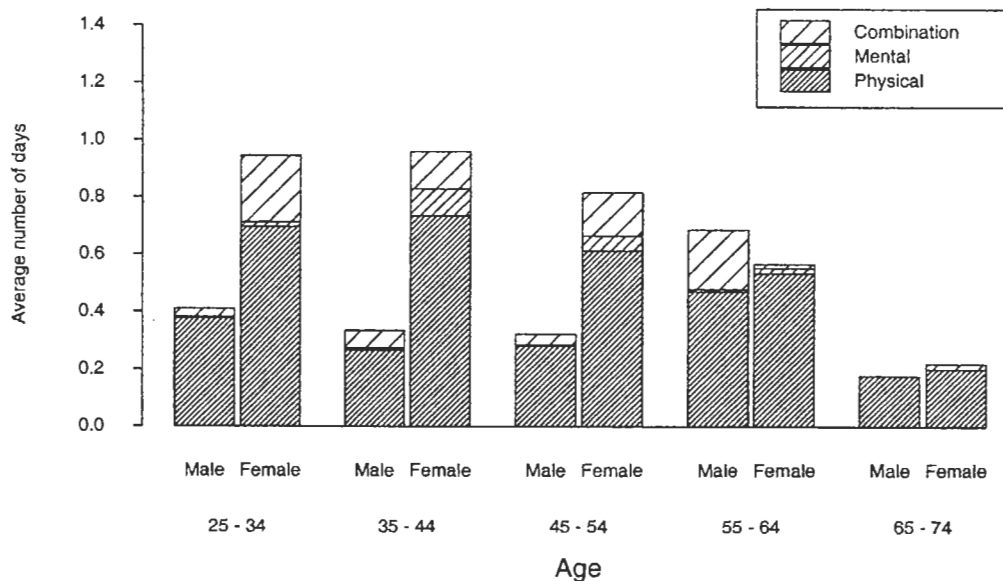
FIGURE 5. Days workers were unable to carry out normal activities (top), and days workers cut back on normal activities (bottom).

the other hand, the prevalence is very high for all age groups. In general, women, especially younger women, report more angina than do men, and the association between angina and objectively determined cardiac abnormalities is weaker in women than in men (Harris and Weissfeld 1991; Nicholson et al. 1999).

One of the most commonly detected physiological conditions that is an important marker for cardiac and general physical condition is
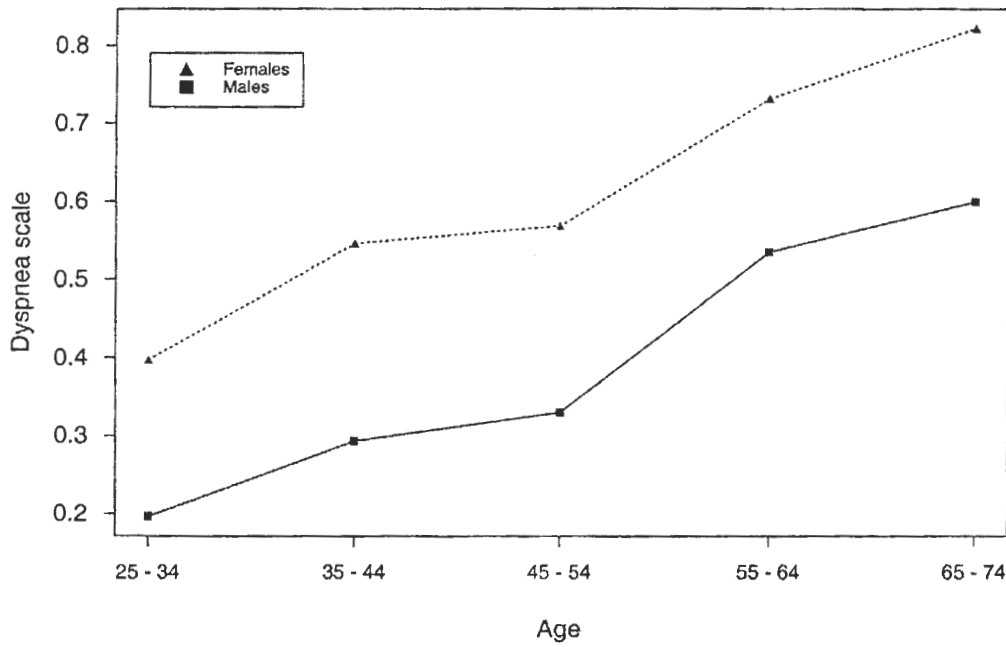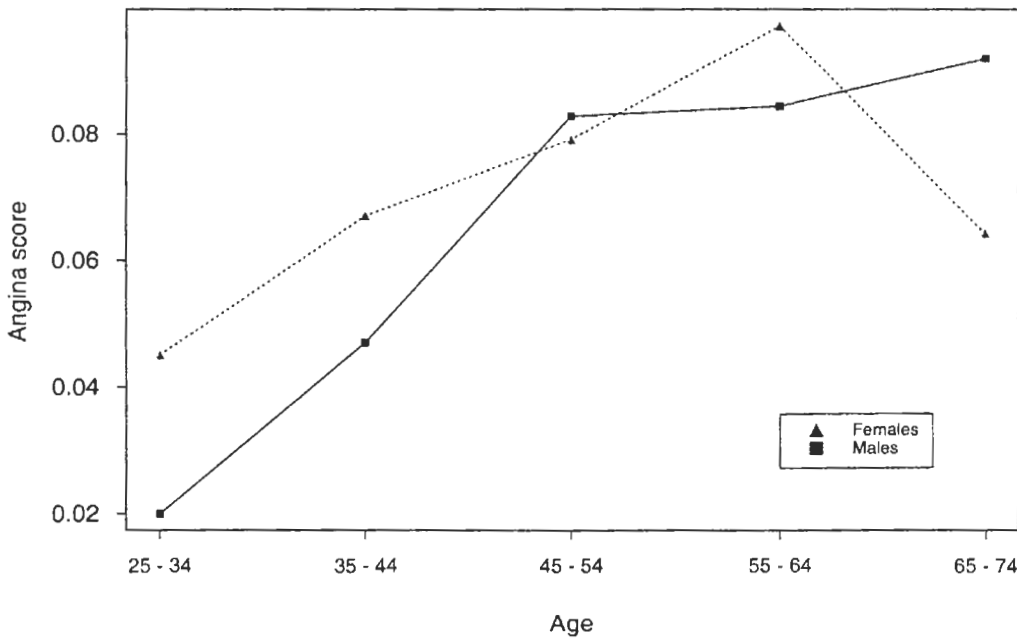
FIGURE 6. Dyspnea scale, 1–4.

FIGURE 7. Angina combined score, 0–3.

hypertension. Although we did not obtain an independent objective measure of hypertension, such as an actual blood pressure reading, we did ask subjects whether they were taking medication for high blood pressure. Positive responses to this question increased steadily with age (fig. 8), and
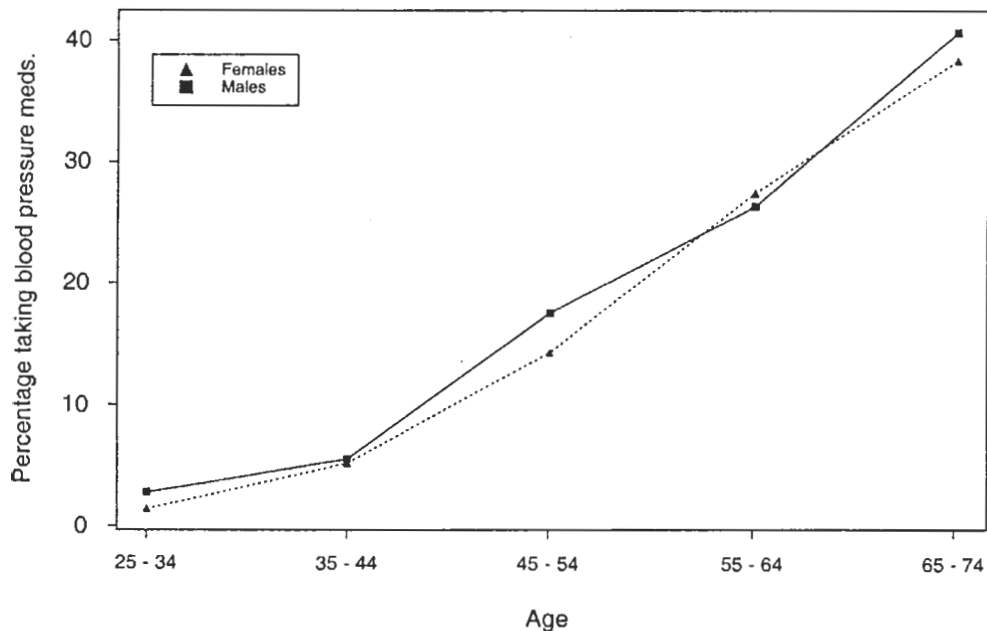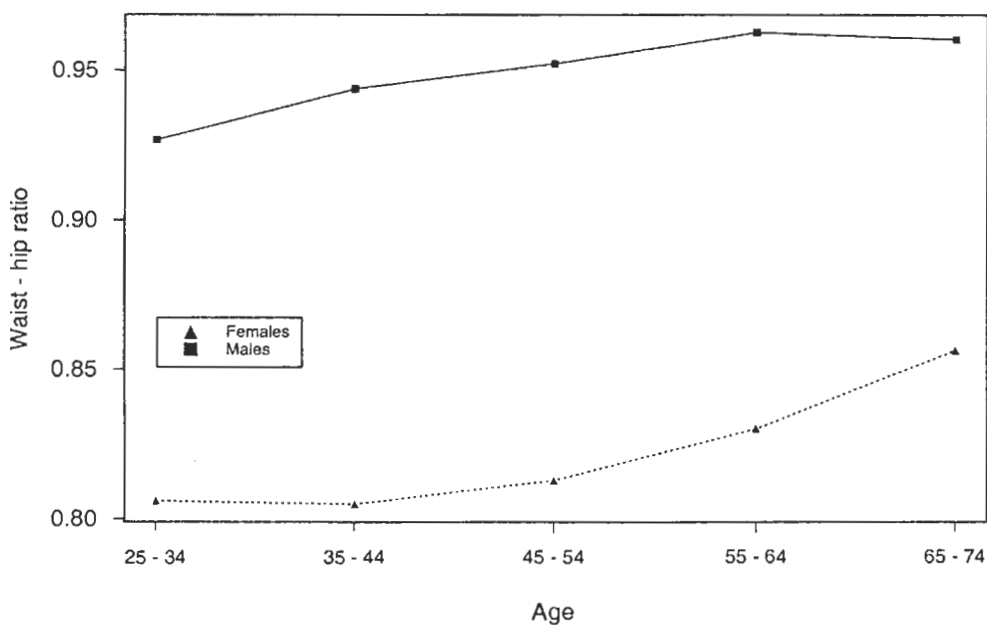
FIGURE 8. Blood pressure medication.

FIGURE 9. Waist–hip ratio.

the proportion of men and women responding positively is similar. There was a similar pattern for responses to a simple question about whether the person had hypertension (data not shown).

Two other measures of physical status in MIDUS that are relatively objective are waist–hip ratio (WHR) and weight, based on body mass index (BMI). WHR (fig. 9) increases steadily with age, and men generally

have a higher WHR than women of the same age. Percentage overweight also tends to increase with age until about the age of 65 (fig. 10). Comparable patterns are observed in national studies using direct measurement (U.S. Department of Health and Human Services 1998).

The MIDUS survey also had a series of questions that asked respondents if they had specific medical conditions. These conditions and the prevalence for men and women are presented in table 1. Because the prevalence of many of these conditions is relatively low, we do not present age differences, but women report significantly more of many of these conditions.

Possible Determinants of Age and Gender Differences

There are substantial gender differences in amplification at all ages (fig. 11), although the differences are smaller in older age groups. To explicate the potential reporting effects in the data presented in this chapter, we recalculated the data presented in figures 4–7 and the prevalence of the chronic conditions presented in table 1, after statistically adjusting for gender differences in amplification.

Adjusting for amplification did not have a consistent impact on the size of the gender differences displayed in figure 4, but the differences in the 45–54 age group were reduced, and the difference in this age
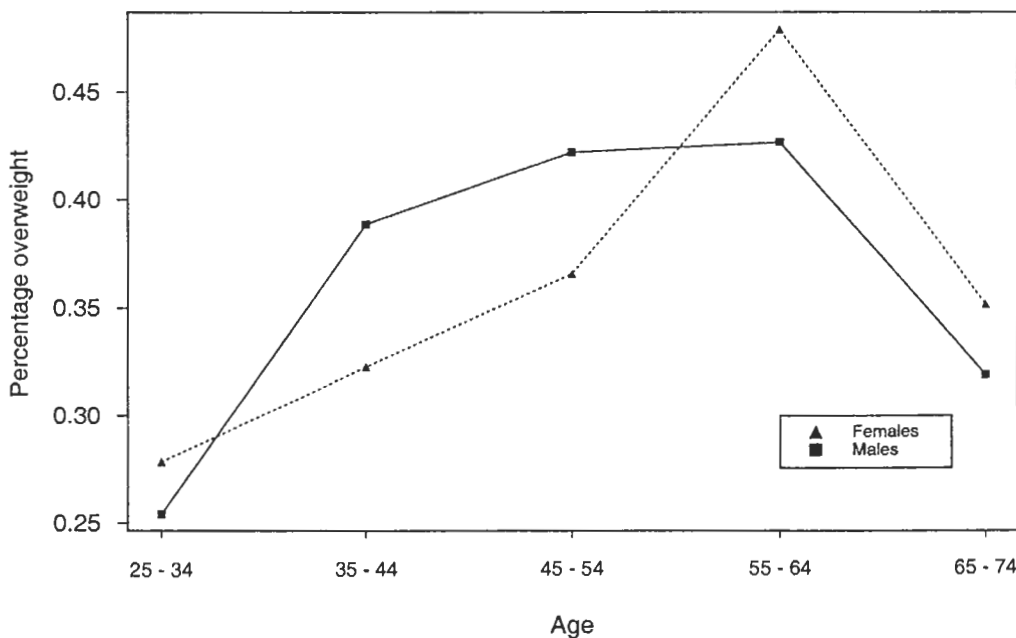

FIGURE 10. Percentage overweight (measured for men as BMI > 27.8 k/m²; for women as BMI > 27.2 k/m²).
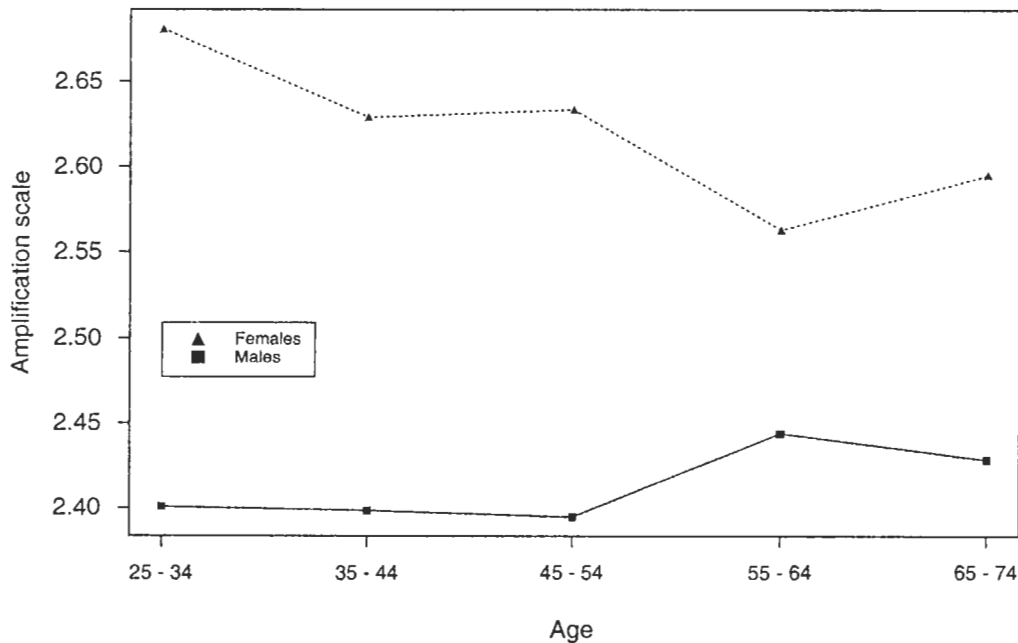
FIGURE 11. Somatosensory amplification, scale of 1–4.

group for days cutback was not significant after adjustment. Adjusting for amplification tended to reduce the sex differences shown in figure 5, but women workers were still significantly more likely to report both more days unable to work and more days cutback at work before and after adjustment.

Adjustment of dyspnea scores for amplification tended to increase the sex differences for respondents under the age of 55 and decrease the differences for those over 55. The sex differences in angina also increased for those under 55, with less consistent effects for those over 55. These effects are probably the result of the larger sex differences in amplification in younger persons (fig. 11). On average, women were significantly more likely to report dyspnea both before and after adjustment for amplification. The average sex difference for angina was not significant either before or after adjustment.

The data in table 1 (column 3, "Unadjusted") suggest that women have significantly higher odds of having asthma, bronchitis, emphysema; arthritis, rheumatism, and bone/joint problems; thyroid disease; stomach problems; urinary and bladder problems; constipation; gall bladder problems; foot problems; lupus and other autoimmune disorders; gum and mouth problems; emotional problems; migraine headaches; and chronic sleep problems. Men have significantly higher odds of having problems with drugs or alcohol. Once we controlled for the effect of

amplification (column 4, "Adjusted for Amplification"), all of the odds ratios are reduced. Only the difference for sleep problems becomes statistically nonsignificant, but there are a number of conditions for which the effect is no longer statistically significant at the same critical value. These include bone and joint problems, foot problems, stomach problems, and the autoimmune disorders. The other differences persisted.

To see how much the tendency to recognize and report conditions is related to overall assessments of health, we conducted similar analyses in which self-assessed physical and mental health were the dependent variables, and we estimated gender differences after statistically controlling for amplification. For both of these variables, gender differences were not statistically significant after controlling for amplification. When we conducted similar analyses with intermediate activities of daily living as the dependent variable, adjusting for amplification, the gender difference remained significant ($p < .0001$).

There are several possible explanations for variations in amplification. One is that for a variety of biological, social, psychological, and cultural reasons, certain people learn to monitor and/or report bodily symptoms more closely than do others. An alternate explanation is that sensitivity to, and/or likelihood of reporting, symptoms is developed as a result of health experiences. To test these explanations, we first selected several health events that we thought were not likely to be influenced by symptom sensitivity or reporting tendencies. These were number of hospitalizations in the previous year, whether respondents reported being told by their physician that they had a heart problem and whether they had ever had a major heart procedure, heart attack, or cancer. We calculated correlations between each of these variables, with amplification separately for men and women. We then developed separate regression models for men and women in which the amplification score was the dependent variable and these health events were independent variables. Among women, none of the predictor variables was significantly correlated with amplification. The regression model for women with all these predictors explained less than 0.2 percent of the variance in amplification scores. In men, however, each of the events, except for having cancer, was significantly correlated with amplification. In a regression model, having had heart problems and the number of times the respondent had been hospitalized remained significant, although the model explained only about 1 percent of the variance in amplification scores among men.

Others have found that individual characteristics, such as neuroticism, are related to the reporting of physical symptoms (Ebert, Tucker, and Roth

2002). To better understand the constellation of individual characteristics that are related to amplification, we examined whether amplification also was related to neuroticism, tendency to seek advice, low perceived control, and/or depression. When we entered these variables into models predicting amplification, neuroticism, advice seeking, and perceived control were significant predictors of amplification for both men and women. Depression also was a significant predictor of amplification for women. For men, having had heart problems remained a significant predictor of amplification, but being hospitalized no longer was. In each of these models, neuroticism was the strongest predictor of amplification.

To assess the extent to which neuroticism explained variability in reporting, we re-estimated the models in which we had assessed the impact of amplification on gender differences, but now we included neuroticism. The results of these analyses suggest that the effects of amplification are related to neuroticism. For example, when we entered neuroticism into the models explaining sex differences in disability, in the three models for which amplification was a significant predictor of disability reports, neuroticism became significant and amplification was nonsignificant. A similar pattern was observed for days on which people cut back on normal activities or work because of dyspnea or angina. There were similar results for many of the conditions in table 1, but neuroticism was a significant predictor of only 17 of the 29 conditions.

Although these associations are modest, they suggest an interesting and potentially important finding regarding the determinants and consequences of different monitoring and reporting styles. That is, some of the observed differences in reported health in this and other similar surveys may be the result of gender differences in sensitivity to symptoms and/or tendency to report symptoms. These differences in reporting tendencies, in turn, may in part be responses to health or health care, although these associations appear to be relatively weak and significant only for men. A more striking pattern is that the general tendency to report symptoms appears to be related to several other personality characteristics. Specifically, those with higher neuroticism scores, greater tendency to seek advice, and low perceived control tend to have higher reports of certain types of health conditions. It also is possible, of course, that the relationship between amplification and the reporting of chronic health conditions is entirely the result of the fact that people amplify and/or have the other characteristics described (e.g., neuroticism, low perceived control, advice seeking) as a result or those conditions and that this is especially true for women.
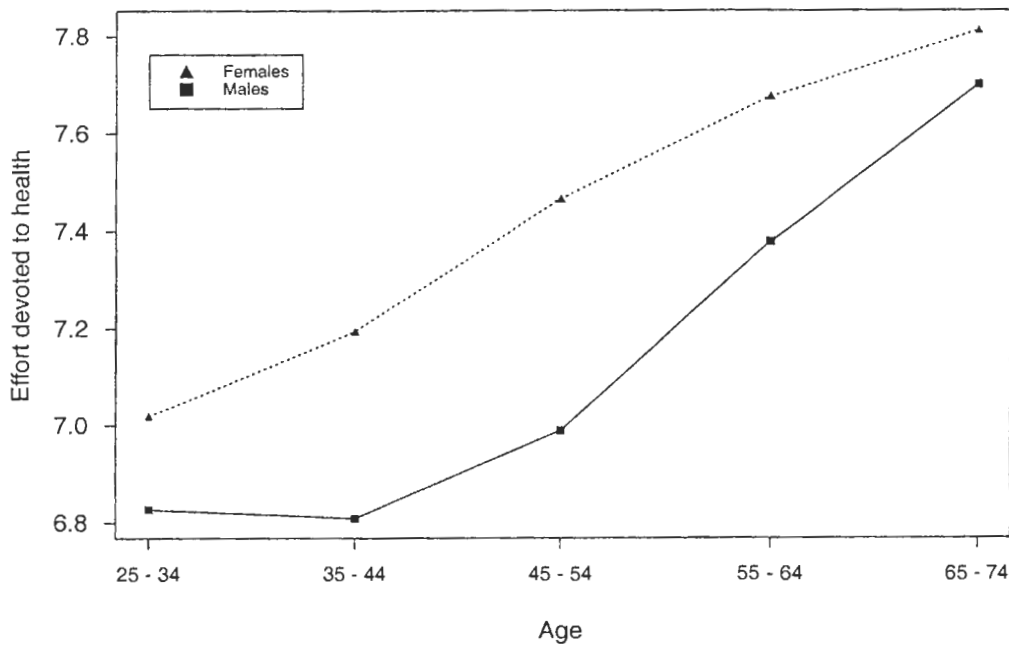
FIGURE 12. Personal effort devoted to health, scale of 0–10.

Interestingly, the adjusted measure of perceived health is not signif-icantly different between men and women, even though there are still significant differences in several conditions and functioning, which is consistent with the findings from the British General Household Survey (Arber and Cooper 1999). It could be that such judgments are based more on conditions that have smaller differences and/or conditions that are influenced least by amplification. Because many of the conditions assessed in this study had a low prevalence and were often correlated, it was not possible to test those hypotheses.

Health Effort

There are many health behaviors and orientations that were assessed in MIDUS, but one of particular interest to us was the effort that people say they devote to different life domains. Figure 12 presents the reported effort devoted to health (on a 0–10 point scale). This variable, like many we have already presented, shows a steady increase with age and indicates that women report they devote more effort to health than do men, with the most pronounced differences in midlife.

To examine whether these trends represented actual behavioral differ-ences or reporting tendencies, we examined the responses to questions that we thought were behavioral markers for effort devoted to health: use of vitamins as well as moderate and vigorous exercise. Data on use of
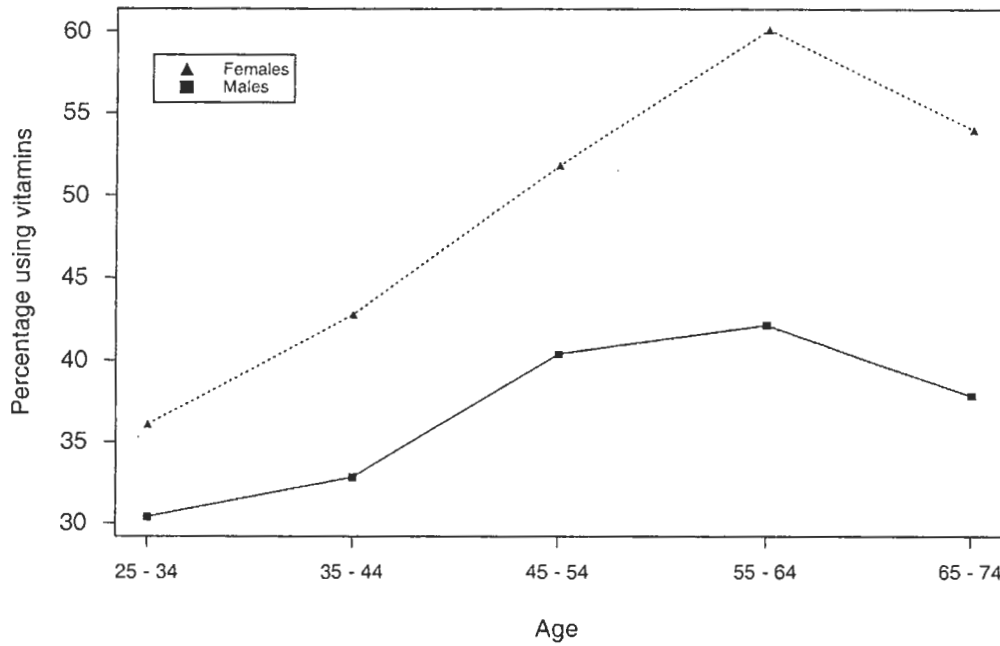
FIGURE 13. Use of vitamins.

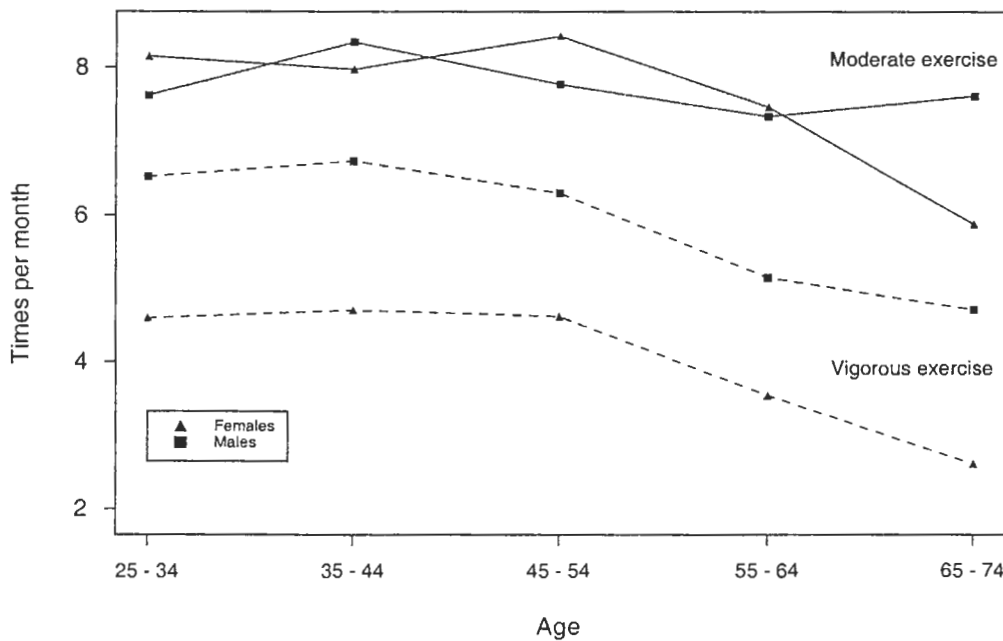FIGURE 14. Moderate and vigorous physical exercise.

vitamins (fig. 13) are consistent with the data on effort devoted to health, except that both men and women show slight declines in the oldest age group, and the increase with age is less pronounced for men than for women. For exercise (fig. 14), reported activity generally declines with age, with vigorous exercise declining more than moderate exercise. The

age differences for moderate exercise are comparable for men and women, but women tend to report engaging in vigorous exercise much less frequently than men. One possible explanation for such a large difference is that men are more likely to be engaged in work activities associated with vigorous activities. When these data are stratified by working and nonworking respondents (fig. 15), the level of vigorous exercise is comparable in nonworking men and women. However, the level of exercise is much higher in men than women among persons working outside the home.

When we estimated a regression model with effort devoted to health as the dependent variable, vitamin use and exercise were significantly related to effort devoted to health; controlling for these variables and an age–exercise interaction, there were still significant age and gender differences. Thus, individual differences in perceived effort are related to actual behaviors, such as vitamin use and exercise, and part of the increase in perceived effort over the life span may be the result of specific activities, such as taking vitamins. It may also be that although more effort is devoted to exercise among older respondents, actual rates of exercise decline. Gender differences in behaviors such as taking vitamins are consistent with the higher reported effort to maintaining health among women, but interestingly, at all ages women report less vigorous exercise. Thus, although women report more health conditions and say they devote more effort to maintaining health than men do, they may be doing less of
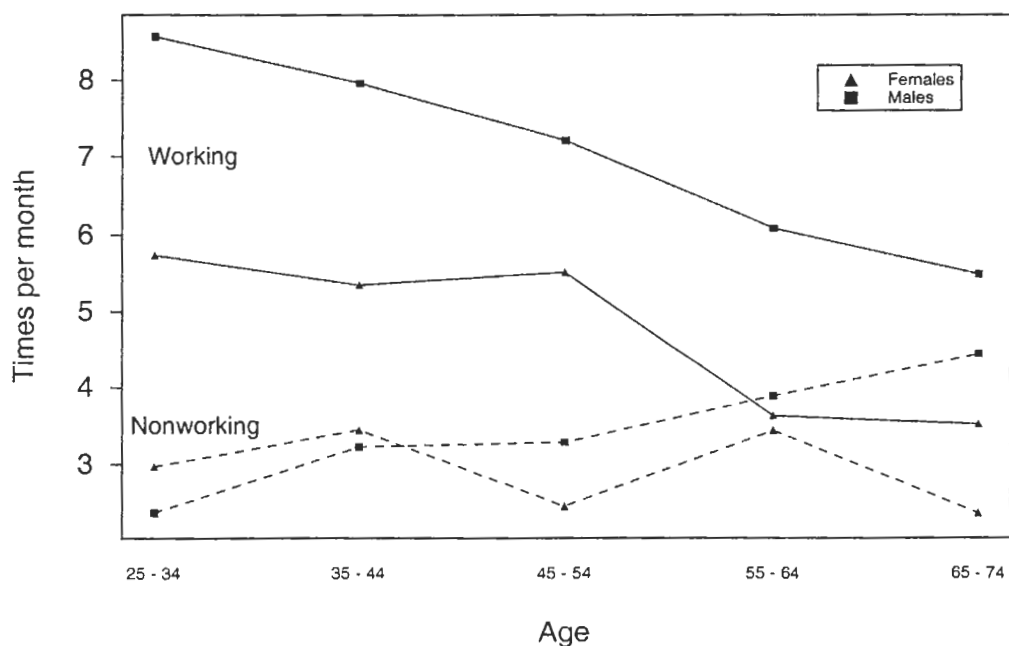

FIGURE 15. Vigorous exercise by gender and work status.

the activities (exercise) that have the most beneficial impact on their subsequent health. One possibility is that they report devoting greater effort to maintaining their health because they spend more time dealing with the conditions that are more prevalent among women. That is, all of the conditions with a higher reported prevalence in table 1 require attention and effort. When people are asked about effort devoted to health, they probably include time spent dealing with chronic conditions as well as time spent on preventive activities and exercise.

SUMMARY AND CONCLUSIONS

Much has been written about the prevalence and incidence of different conditions at different points in the life course. The MIDUS survey is unique, however, because in addition to collecting a rich array of health status indicators such as measures of health behavior and health attitudes, it also collected a wealth of psychological and social information. Thus, MIDUS data allow us to characterize age and sex differences in ways previously not possible.

Sex differences in ratings of global mental health were not significant when we controlled for amplification, suggesting that they may be due in part to sensitivity to symptoms or reporting tendencies. However, it also may simply be that the tendency to amplify is a result of mental health problems, an interpretation supported by the association between neuroticism and amplification. On a variety of more specific symptoms and the measures of functional status, women also tended to report more problems. These analyses showed that for a variety of conditions, controlling for amplification reduced the gender differences. After controlling for amplification, however, women were still significantly more likely to report having twelve of the chronic conditions asked about, and men were significantly more likely to report alcohol or drug problems. This result is consistent with other large population studies showing that women are more likely to report chronic conditions and distress than men but that men are more likely to engage in heavy drinking (McDonough and Walters 2001).

Although women report worse health on a variety of dimensions, they also report that they devote more effort to maintaining their health. These reports were consistent with analyses of more specific behaviors, such as use of vitamins. However, even when we controlled for vitamin use and exercise, there were still significant differences in reported effort. This residual effort could be because women devote more time to specific activities that were not asked about in the MIDUS survey. In addition, there are

multiple interpretations of devoting effort to health. Although our intent was to assess active efforts, people might interpret their overall lifestyle when responding to such questions. Other studies have consistently found that men engage in more risky behavior and women engage in more preventive behavior as well as treatment seeking and self-care for illness (Courtenay, McCreary, and Merighi 2002; Doyal 2001; Waldron 1997).

Although these data provide important insights into possible mechanisms affecting sex differences in reports about health, they leave unanswered the question of how much of the difference is the result of biological differences and how much is the result of differences in the recognition and response to such conditions. For example, studies of the relationships among ischemic heart disease, reported chest pain, and subsequent mortality (Cohn et al. 1990; Harris and Weissfeld 1991; Nicholson et al. 1999) have been very helpful for elucidating the biological mechanisms related to reports of pain as well as the epidemiological importance of self-reports of angina. Similarly, other studies in which researchers were able to relate biological markers of disease severity to self-reports (Angel and Cleary 1984; Katz et al. 1994) have provided important information about the factors affecting the perception of, and response to, health conditions. If future studies were to include more psychological variables known to be related to the recognition and response to health conditions, such as stress and amplification, they would help illuminate some of the types of complex patterns in reported health states presented in this chapter.

One of the intriguing findings in studies of sex differences in health is that despite the higher prevalence of functional impairment (Arber and Cooper 1999) and chronic conditions, women have a substantial longevity advantage over men (Nikiforov and Mamaev 1998; Verbrugge 1985; Waldron 1983, 1993; Wylie 1984), but the reasons for this survival advantage are not fully understood. One of the most important biological differences is the greater tendency of men to develop cardiovascular disease earlier in life (Doyal 2001), but the higher cardiovascular disease mortality rates among men have not been fully explained (Nikiforov and Mamaev 1998). The relative cardiovascular risk of men and women has changed substantially over time as risk behaviors such as smoking have changed (Waldron 1993), and some have argued that the excess mortality is due in large part to factors associated with the development of industrialized societies (Nikiforov and Mamaev 1998).

One set of risks men may face more than women do are those associated with paid work (Doyal 2001), but efforts to identify environmental

stressors that fully explain sex differences in mortality have not been successful (Nikiforov and Mamaev 1998; Wylie 1984). There also are potentially important social theories as to why there should be sex differences in both morbidity and mortality. For example, it has been observed that there are no societies in which women are treated as equals with men and that many women have heavy burdens of work and receive relatively little social support (Doyal 2001). However, investigations of the impact of work and multiple social roles have concluded that women's employment does not have a net negative impact on their health (Walters, McDonough, and Strohschein 2002). In fact, they may benefit from such roles through mechanisms such as increased social support (Repetti, Matthews, and Waldron 1989; Waldron and Jacobs 1989).

The data presented here illustrate the importance of taking reporting tendencies into account when analyzing self-reported data. But more importantly, they illustrate that possibly through a variety of biological, socialization, or psychological differences, women learn to monitor and respond to physical changes differently than men. They also are more likely to engage in a variety of activities that may be beneficial to health. Thus, rather than just being a reporting tendency, the tendencies revealed by the amplification scale used in this study may be indicative of learned dispositions and behavior that are beneficial for survival. More studies that combine biological and psychosocial measures would help understand these important and complex patterns.

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