5-2005

The Effect of Social Support on Physical Health in Older Individuals

Erin M. Jackson

The Effect of Social Support on Physical Health in Older Individuals

by

Erin M. Jackson

Undergraduate honors thesis under the direction of

Dr. Katie Cherry

Department of Psychology

Submitted to the LSU Honors College in partial fulfillment of
the Upper Division Honors Program.

May, 2005

Louisiana State University
& Agricultural and Mechanical College
Baton Rouge, Louisiana

Running Head: Social Support and Physical Health

The Effect of Social Support on Physical Health in Older Individuals

Erin M. Jackson

Louisiana State University

Abstract

Social support has been shown to influence health outcomes in later life. This study examined the relationships among health behaviors, social network characteristics, and three dimensions of physical health. Analyses were conducted to examine the influence of gender and age on positive health behaviors, social network characteristics and our physical health indices. Participants were sampled from the Louisiana Healthy Aging Study, a multidisciplinary study of the oldest old conducted in collaboration with researchers from Louisiana State University Health Sciences Center and Pennington Biomedical Research Center. Results showed that positive health behaviors and higher levels of social support were associated with higher levels of self-perceived health and objective physical functioning, but not objective health status. Results also showed that the young-old had higher levels of exercise and physical health than the old-old, and that males had higher levels of alcohol and tobacco use, exercise, self-perceived health, and objective physical functioning than females. Implications of these results and directions for further research are discussed.

The Effect of Social Support on Physical Health in Older Individuals

With medical advancements and improved health behaviors, life expectancy and the proportion of older people in the population have been increasing. This increase is expected to continue in the future. This trend has important implications for individuals and families, as well as social services and programs. As people age, they are likely to experience disease and disability. As the proportion of older people in the population increases, there will be more demand for social programs, such as Social Security and Medicare, and fewer people to support these programs. Determining ways in which individuals can maintain physical and mental capabilities in later life will benefit both individuals as well as social programs, helping individuals to have a higher quality of life and lessening financial strain on social programs.

This paper is organized as follows. In the first section, we discuss perspectives on aging, including the demographics of aging and various ways that successful aging has been conceptualized in the literature. In the next section, we discuss the relationship between physical and social functioning in late life. We consider physical functioning first, followed by social functioning. In this context, theories of social adaptation are presented, as well as the experimental basis for the predictions tested in the present research. The specific aims of the present research follow. Next, the methodology section is presented, including a description of the participants, physical functioning measures, and data analysis plan. The proposal concludes with a discussion of results and significance of these findings.

Perspectives on Aging

Demographics

The population of the U.S. is aging, as are the populations of all modern industrial societies. The number of older people in the population has been increasing since the turn of the

century and is expected to continue to increase in the future. The first of the large baby boom cohort will reach 65 after the year 2010 (Kinsella & Velkoff, 2001). As of 2000, there were approximately 35 million people over age 65 in the U.S., and this number is expected to increase to nearly 87 million in the year 2050 (U.S. Census Bureau, 2004). The older population itself is also aging. Life expectancy at birth is currently 76 years, and it is expected to increase to 79 years in 2020 (S.M. Jazwinski, 2001). In the U.S. and many other nations the fastest growing segment of the population is 80 years of age and older (Kinsella & Velkoff, 2001). According to the U.S. Census Bureau, this segment accounted for 1.5% of the total population in 2000, and in 2050 it is projected to make up 5% of the total population. With high incidences of disablement and disease, this oldest segment of the population is also the segment with the greatest need for health care and support services.

The aged dependency ratio, the ratio of the retirement-age population to the working-age population, is also expected to increase (Tuljapurkar, Li, & Boe, 2000). There are currently 5 people of working age for every person of retirement age. By 2025 there are expected to be only 3 people of working age for every retirement-age person (S.M. Jazwinski, 2001). This means that there will be more people eligible to receive benefits such as Social Security and Medicare and fewer people to support these benefits. Continued increase in the older population, especially those aged 85 and above, likely means an increase in disability rates. This oldest segment of the population is at increased risk for many types of disease and disability, as will be discussed in more detail later. This may have serious economic implications for disabled elderly, their families, and government programs, such as Social Security and Medicare. The most recently predicted insolvency dates provided no preventative actions are taken are 2042 for Social Security and 2019 for Medicare (Sherman & Strope, 2004).

Successful Aging

To lessen the high cost of disability in the older population, we must discover ways to promote successful aging in individuals. In order to determine ways to promote successful aging we must be able to measure it, and in order to measure successful aging, we must first define it. Successful aging is not one, but many things. Oftentimes longevity is used to measure successful aging. However, as the first motto of the Gerontological Society of America suggests, the goal of aging is, "adding life to years, not just more years to life." Aging successfully encompasses all areas of life including physical and mental health as well as satisfaction with life. One important model that accounts for the complexity of successful aging is Rowe and Kahn's. Prior to Rowe and Kahn's 1987 article, gerontology typically distinguished between only two types of aging: pathologic, which included those suffering from disease or disability, and nonpathologic, which included those free from disease and disability. Rowe and Kahn proposed three types of aging: successful, usual, and pathological. They divided nonpathologic aging into two subcategories to distinguish between those free from disease and disability, but at high risk (usual) and those free from disease and disability and at low risk (successful). According to Rowe and Kahn, there are three components necessary for successful aging: avoidance of disease and disability, maintenance of high physical and cognitive function, and active engagement in social and productive activities. The relationship among these components is somewhat hierarchical. That is, people must be free from disease and disability in order to be cognitively and physically functional, and they must have functional capacity to be actively engaged in life.

Aging is often associated with declines in health and cognitive functioning. However, most older people are optimistic about their situations despite possible poor physical health (Whitbourne, 2001). Moreover, the majority of older people rate their health as good and do not

suffer serious disability as a result of chronic illness (Atchley & Barusch, 2004). Aging does not necessarily result in chronic disease and disability, and by discovering ways to promote successful aging we will be able to reduce the proportion of older people suffering from health problems.

Ways of measuring successful aging that account for physical and mental health as well as satisfaction with life employ both subjective and objective measures. Objective measures include physical, psychological, and social functioning, and subjective measures include life satisfaction and quality of life (Baltes & Baltes, 1990). Further research is needed to determine the factors associated with successful aging so that we might increase not only the length of life, but also the quality of life.

Relationship between Physical and Social Functioning

Physical Functioning

Although physical and social functioning varies widely among older adults, most experience changes in levels of functioning as they age. For example, aging is often associated with a decline in physical functioning. Cardiovascular function often declines with age. Aerobic capacity, the maximum amount of oxygen that can be delivered through the blood, decreases. Cardiac output, the amount of blood the heart pumps per minute, also decreases, as does maximum heart rate. Cardiovascular pathologies, such as arteriosclerosis, hypertension, coronary artery disease, and myocardial infarction, are a major cause of death and disability among those over 65 (Whitbourne, 2001). There is an overall decline in pulmonary function as individuals age. Common pulmonary diseases in old age are chronic bronchitis, which leads to an increased likelihood of respiratory infection, and chronic emphysema, characterized by a shortness of breath (Whitbourne, 2001). Cancer incidence rises in late life because of cumulative

exposure to carcinogens (Whitbourne, 2001). Many older people also face a decline in mobility. Osteoarthritis, a painful degenerative joint disease, and rheumatoid arthritis, an autoimmune disease that causes pain and loss of joint function, affect over half of adults over 65 (Whitbourne, 2001). Osteoporosis, a loss of bone mass, also poses a threat to mobility and independent functioning, especially in older women. Older people are also at greater risk for dementia, which causes severe loss in cognitive function. Alzheimer's disease, the most common form of dementia, affects approximately 12% of people over 65 and 50% of people over 85 (Whitbourne, 2001).

Many of these physical declines can be minimized through positive health behaviors. Not smoking reduces the risk for cardiovascular disease, pulmonary disease, cancer, and osteoarthritis. Moderation in alcohol use may protect against coronary heart disease, whereas heavy alcohol consumption increases the risk of stroke, liver damage, cancer, and heart disease. A healthy diet and maintaining ideal weight can prevent cardiovascular disease and cancer, and a diet rich in calcium can protect against osteoporosis. Exercise reduces the risk for cardiovascular and pulmonary disease. Avoiding exposure to the sun protects against skin cancer. High levels of mental activity have been found to protect against dementia (Whitbourne, 2001).

Social Functioning

Social functioning is another important aspect of healthy aging. Like changes in physical functioning, changes in social functioning are common in aging individuals. For example, older people often have to face the loss of loved ones who have been important parts of their social network and a decreased ability to function independent of help from others. Also, as they retire, many older people must find new and meaningful ways to spend the time formerly spent

working. Several theories have been proposed concerning adaptation to changes in social functioning with aging.

Theories of Social Adaptation

Baltes and Baltes' Selective Optimization with Compensation (SOC) model expresses a general way of adapting to change. Although this process is used throughout the life course, it becomes increasingly important as individuals' minds and bodies age and lose functional capacity. The three components of the SOC model are selection, optimization, and compensation. Selection refers to the selection of a reduced number or range of high priority activities and is used when individuals are mentally or physically unable to participate in a wide range of activities. Optimization refers to focusing on doing the selected activities well (optimizing one's performance). Compensation refers to the use of strategies to compensate for reduced physical and mental functioning. This model allows older adults to participate in meaningful activities despite increasing mental and physical restraints.

Laura Carstensen's theory of socioemotional selectivity addresses the increasing importance of social relationships in later life. According to socioemotional selectivity theory, individuals' perceptions of time are critical in their choice of goals. If time is perceived as expansive, individuals tend to choose goals related to the acquisition of knowledge, whereas if time is perceived as limited, individuals tend to choose goals related to the regulation of emotion (Carstensen, Isaacowitz, & Charles, 1999). The acquisition of knowledge is associated with preparation for the future, whereas emotion regulation is concerned primarily with the present. Older people, who often perceive the remainder of their life as limited, often focus on the present-oriented goal of emotion regulation. When regulation of emotion is the main goal, individuals are selective in their choices of social interactions and strive for high quality

emotional experiences (Carstensen et al., 1999). Therefore, older people often focus on smaller social networks that are more emotionally meaningful (Carstensen, Gross, & Fung, 1997).

Experimental Basis for Predictions

Higher levels of social support have been shown to be predictive of longevity and successful aging. Social support has been found to positively affect factors associated with healthy aging, including productive activity, physical performance, and disease risk factors (Rowe & Kahn, 1997). Research has shown strong evidence that social integration is associated with reduced risk of mortality and a better state of mental health (Seeman, 1996). With regard to physical health, research has been somewhat inconsistent. Some research has shown that higher levels of social support are associated with higher levels of physical functioning and reduced risk of mortality, especially in individuals who have had heart attacks (Seeman, 1996). Research has also shown that higher levels of social engagement are associated with a lower risk of mortality (Walter-Ginzburg, 2002). In women, higher levels of satisfaction with social support have been shown to predict better physical functioning, less future hospitalization, and lower rates of mortality (Ostir, Simonsick, Kasper, & Guralnik, 2002). Other research has shown that certain aspects of social support protect against decline in physical functioning in individuals without chronic conditions, but have no protective effect for those with chronic conditions (Bisschop, Kriegsman, van Tilburg, et al., 2003). Research has also shown that when health behaviors, such as smoking, depression, and alcohol abuse, are controlled for, the relationship between social support and physical health is attenuated (Vaillant, Meyer, Mukamal, & Soldz, 1998).

Unger, McAvay, Bruce, Berkman, and Seeman (1999) examined the relationship between self-reported physical functioning and social support characteristics in 850 high-functioning male and female participants aged 70-79. The Nagi physical functioning scale was used to measure

self-reported physical functioning, and consisted of items addressing perceived difficulty performing five physical tasks. The social support characteristics measured were marital status (married or not married), number of social ties other than spouse, emotional support (how frequently social network members would listen when participant had a problem and make the participant feel loved and cared for), and instrumental support (how frequently social network members helped with daily tasks and provided information). Several covariates were included in the analyses. Demographic covariates included age, gender, ethnicity, education, and income. Health behaviors used as covariates were alcohol use, smoking, and physical activity. Other covariates were baseline physical and psychological health status. Results showed that participants with a higher number of social ties showed significantly less functional decline. This effect was stronger for men than women. A higher number of social ties was protective at all levels of physical functioning, but especially for participants with low levels of baseline physical performance. Perhaps if participants represented a wider range of functioning, social support effects would be stronger, especially for low-functioning participants. For example, Seeman and Chen (2002) found that for participants with cardiovascular disease, higher emotional support was associated with higher baseline levels and less declines in physical functioning. Thus, one important direction for future research is to include a broader age range that would likely result in a wide range of physical functioning. Subsequent research has supported Unger's finding that a larger social network is associated with less functional decline. Zunzunequi, Kone, Johri, et al. (2004) found that higher levels of social integration and a strong network of friends was associated with better self-rated health. Avlund, Lund, Holstein, and Due (2004) found that a large diversity in social relations and high levels of social participation were

associated with the retention of functional ability in 75-yr-old men and women. However, their results showed that social support was a risk factor for functional decline in 80-yr-old men.

Michael, Colditz, Coakley, and Kawachi (2000) measured health behaviors, social network characteristics, and subjective physical functioning in 56,436 women aged 55-72 and found elements of a woman's social network and health behaviors to be significantly correlated with self-reported levels of physical functioning. To measure physical functioning they used the Medical Outcome Study Short Form-36 (SF-36) Health Survey that measures eight dimensions of health (described more fully below). Michael et al. (2000) used four of these dimensions: physical function, bodily pain, vitality, and limitations in role functioning due to physical health. To measure social networks, participants were categorized into four levels of social connection based on marital status (married or not married), sociability (number of and frequency of contact with extended family and close friends), church group membership (yes or no), and membership in other community organizations (yes or no). The presence of a confidant, contact with living children, and frequency of community organization participation were also taken into account. The health behaviors measured were smoking, alcohol consumption, exercise, and Body Mass Index (BMI). Education, minority status, and self-reported co-morbid conditions were controlled for. This study found positive health behaviors to be associated with higher levels of physical functioning for all health behaviors measured. Certain aspects of social support highly correlated with physical health measures. The absence of a confidant or close friends or relatives was strongly correlated with low levels of physical functioning. Participation in community organizations was also correlated with higher levels of physical functioning, especially in the oldest age group. The presence of a confidant or close friends or relatives and group participation were weakly associated with lower levels of bodily pain. The presence of a

confidant or close friends or relatives and group participation were strongly correlated with higher levels of vitality. For the limitations in role functioning due to physical problems subscale, higher levels of group participation and the presence of close friends and relatives were associated with less limitation due to physical problems. Results of the Michael et al. study clearly indicate that one's social network characteristics are associated with the retention of physical function in late life, but two methodological limitations should be noted. First, Michael et al. only included women in their study, so it is not presently clear whether the same pattern of benefits would be observed for men. Second, they used a self-report index of physical activity (the SF-36) and did not include objective measures of physical function. Note also that Unger et al. (1999) used self-report measures of physical function (the Nagi Physical Functioning Scale). We have addressed these limitations in the present research by including equal numbers of men and women in the sample, which will allow us to empirically address the issue of possible gender differences in the beneficial effect of social networks on physical health. We have also included a broader age range than has been used in previous research (i.e., age 60 to over 90 years). We included the Continuous Scale - Physical Functional Performance (CS-PFP) as an objective measure of physical activity, as well as paper and pencil measures of physical activity (Yale Physical Activity Scale and Katz's Functional Status Index).

Specific Aims

This present study extends previous research by including both men and women, looking at whether there are differences between age groups that include the oldest old, and including a wide range of physical functioning. We also conceptualize physical health along three dimensions, including self-perceived health (items taken from the SF-36, demographic questionnaire, and Katz' Functional Status Index), objective health status (items from the

demographic questionnaire that pertain to chronic conditions), and physical functioning (indexed by the CS-PFP).

Operational Definitions

For the purpose of this study, positive health behaviors were defined as behaviors that have been found to reduce the likelihood of disease and disability. Positive health behaviors that were accounted for in this study were alcohol use, smoking status, and exercise (indexed by the Yale Physical Activity Scale). See above section on physical functioning for positive effects on health.

For the purposes of this study, social network characteristics were operationally defined along two dimensions, including: *perceived emotional support and the level of social engagement* (described more fully below). Previous research has found instrumental support, the amount of help or assistance a person receives with daily tasks, to have ambiguous effects on measures of physical health. In 1996, Seeman, Bruce, and McAvay found instrumental support to be associated with an increased risk of functional disability among men, and similar, though non-significant, results in women. However, Unger et al. (1999) found no significant relationship between instrumental support and functional decline. It is unclear whether instrumental support has a significant effect on functional decline. In studies that found instrumental support to be associated with functional decline, it is not clear whether instrumental support was a cause or result of poor physical health, but it is possible that those who receive instrumental support receive it because they need it and are already in poor physical health. Therefore, we did not include measures of instrumental support in the present research. Also, we originally proposed structural support as a dimension of social network characteristics, which would include marital status and presence of a confidant. However, preliminary investigations

showed no significant relationships among marital status and presence of a confidant with our variables of interest. One explanation for marital status might be that many of the participants, especially old-old females were widowed and we did not have enough information to assess the length of their marriage prior to widowhood, which would likely have impacted their social network. Concerning the presence of a confidant, almost all participants reported having a confidant.

To determine whether certain aspects of one's social network characteristics have a positive effect on physical health, we measured perceived emotional support and social engagement. Perceived emotional support was measured by participants' rated satisfaction with support received from others for dealing with problems that arise in everyday life. Social engagement was measured by the number of club or organization memberships and number of hours spent outside the home. These two components of social support paint a clear picture of participants' social network characteristics.

Self-perceived health was measured using the SF-36 Health Survey, three questions from the demographic questionnaire that tap self-perceptions of health, and Katz's Functional Status Index. The SF-36 is a self-administered 36-item questionnaire designed to measure a wide range of functioning in eight dimensions of health. These dimensions include physical functioning, role physical, bodily pain, general health perceptions, vitality, social functioning, role emotional, and mental health. Scores on these eight dimensions are aggregated to form a Mental Health and Physical Health composite score, where higher scores indicate better health and well-being. For the present research, we used the composite self-perceived physical health score (PCS). The three questions we used from the demographic questionnaire were: how would you rate your health at the present time; how much do health troubles stand in the way of your doing things

you want to do; and do you think your health is better, the same as, or worse than most people your age. Katz's Functional Status Index is a paper-and-pencil measure of activities of daily living (described in more detail later). Objective health status was determined using three questions from the demographic questionnaire (number of visits you have had to the doctor in the past year; number of nights you stayed as a patient in the hospital in the past year; the number of days home sick in bed in the past year). The number and type of chronic conditions are comprehensively assessed in the Louisiana Healthy Aging Study (LHAS) by a nurse practitioner. Unfortunately, these data were not available for the majority of participants selected for inclusion in this study. Therefore, we do not include number of chronic conditions as an indicator of objective health status as originally proposed. Objective physical functioning was measured using the CS-PFP, which is a performance-based test that measures ordinary tasks of daily living (described in more detail later).

To summarize, we expected to observe significant age and gender effects on positive health behaviors, social network characteristics and the physical health dimensions. This prediction was based on empirical findings in the literature that are suggestive of age differences (Michael et al., 2000) and gender differences (Unger et al., 1999) in measures of physical health and social network characteristics. To address these hypotheses, we first conducted separate multivariate analyses of variance (MANOVAs) on positive health behaviors, social network characteristics and the physical health dimensions with age and gender as factors as described in Phase 1 of the data analysis plan. In all of the analyses that follow age and gender are treated as dichotomous variables.

In addition, we expected that certain aspects of individual health behaviors and social network characteristics would be associated with healthy aging. Specifically, we hypothesized:

1. Positive health behaviors and social network characteristics will be associated with higher levels of self-perceived health;

2. Positive health behaviors and social network characteristics will be associated with higher levels of objective health status;

3. Positive health behaviors and social network characteristics will be associated with higher levels of physical functioning.

To address our three hypotheses regarding the relationships among positive health behaviors, social network characteristics, and the physical health dimensions, we conducted correlational analysis among the variables as described in Phase 2 of the data analysis plan (presented later).

Method

Participants

Participants were sampled from the LHAS, which is a multidisciplinary study of the oldest old conducted in collaboration with researchers from LSU – Baton Rouge, LSU Health Science Center, the Pennington Biomedical Research Center, and University of Alabama at Birmingham. In all, a total of 100 persons were sampled from the LHAS database to create two age groups with fifty persons per age group (n = 50): young-old adults (persons between the ages of 60 and 84) and old-old (persons ages 85 and above). Within each age group, half of the participants are male (n = 25) and the other half are female (n = 25). All participants included in the sample were free of dementia as indexed by the Mini-Mental State Exam, a common measure of cognitive status.

For all participants, measures of verbal ability (a short-form of the WAIS vocabulary test, Jastak & Jastak, 1965), socio-demographic characteristics, affective status, and cognitive status

were available. The demographic questionnaire included items that assessed: age, gender, marital status, educational attainment, occupational status, self-perceived health, social activity characteristics, and perceived emotional support (i.e., presence of a confidant). The affective status measure is the Geriatric Depression Scale (Sheikh & Yesavage, 1986). The cognitive status measure is the Mini-Mental Status Exam (Folstein, Folstein, & McHugh, 1975). These data are summarized and presented in Table 1 to provide a detailed description of the characteristics of the sample.

The LHAS is a population-based study where participants who live within a 40-mile radius of Baton Rouge (which includes 8 parishes) are recruited to participate, as follows. First, participants are randomly sampled from voter registration lists and the Center for Medicare and Medicaid Services files by personnel in the School of Public Health at the LSU Health Sciences Center in New Orleans. Information about the LHAS is mailed to potential participants with a self-addressed, stamped envelope and postcard to return to indicate their interest in participating. Those who return their postcards to the Pennington Biomedical Research Center (PBRC) are called and scheduled for a pre-visit where informed consent is obtained. In subsequent visits, medical history and other questionnaires are administered. For those over age 70, this information is solicited in a home visit. Others supply this information in a preliminary screening visit at the PBRC. Following the preliminary work, a day-long testing session is held at the PBRC where participants are given multiple measures of physical health and cognitive performance measures.

Overview of Physical Function Measures

Yale Physical Activity Survey

We used the Yale Physical Activity Survey (YPAS) as a measure of exercise, which is one of our positive health behaviors. The YPAS is a paper and pencil measure of self-reported physical activity. The YPAS asks participants to indicate the number of hours spent doing certain physical activities during a typical week in the last month. The activities include household, exercise, and recreational activities. The YPAS yields three summary scores for each participant: the total time summary index (in hours per week), the energy expenditure summary index (in kilocalories per week), and the activity dimensions summary score (includes frequency and duration information). We used all three summary indices in the correlational analyses presented in Phase 2 of the data analysis. The YPAS is reliable and has been well validated (DiPietro, Caspersen, Ostfeld, & Nadel, 1993).

Katz's Functional Status Index

We used Katz's Functional Status Index (FSI) of activities of daily living (ADL) as one of our measures of self-perceived health (Jette, 1980). This questionnaire measures various daily activities such as dressing, doing household chores, and engaging in social activities based on the level of assistance required in achieving each task (FSIA), the amount of pain experienced with each task (FSIP), and the difficulty in completing each task (FSID). A lower score on this measure indicates more independence in ADLs. FSIA item scores range from 1 to 5, where 1=independent, 2=uses devices, 3=uses human assistance, 4=uses devices and human assistance, and 5=unable or unsafe to do the activity. FSIA total scores range from 18-90. FSIP item scores range from 1 to 4, where 1=no pain, 2=mild pain, 3=moderate pain, and 4=severe pain. FSIP total scores range from 18-72. FSID item scores range from 1 to 4, where 1=no difficulty,

2=mild difficulty, 3=moderate difficulty, and 4=severe difficulty. FSID total scores range from 18-72 (Jette, 1980).

Continuous Scale – Physical Function Performance Test

Through the use of a scripted dialogue and standard conditions, the Continuous Scale – Physical Function Performance Test (CS-PFP) measures physical functioning that reflects ordinary tasks of daily living. The CS-PFP consists of eleven separate tasks, which include picking up scarves, putting on a jacket, reaching, sweeping the floor, loading and unloading a washer/dryer and moving laundry (two tasks), sitting down on the floor and standing back up, climbing stairs, carrying groceries, walking, and carrying weights. The various tasks are measured using time, distance, or weight, according to the demands of the task. The CS-PFP was developed by Dr. Elaine Cress, of the University of Georgia. The CS-PFP was designed to assess a wide range of physical functioning, and has been well validated (Cress, Buchner, Questad, Esselman, deLateur, & Schwartz, 1996). A more detailed review of this measure is available on the Internet at www.coe.uga.edu/cs-pfp. The CS-PFP total score ranges from 0-100, where a higher score denotes better performance. This score is an average of five physical domain scores: upper body strength, lower body strength, flexibility, balance and coordination, and endurance. The data is reduced using an algorithm provided by the creator of the test, Dr. Elaine Cress.

Results

Phase 1: Role of Age and Gender

Positive Health Behaviors

To examine the influence of age and gender on positive health behaviors, we conducted a multivariate analysis of variance (MANOVA) with age and gender as the independent variables

and positive health behaviors as dependent variables (see Table 2). This analysis (Wilks criterion) yielded a significant age group effect, $F(5,92) = 3.828$, $p = .003$. Univariate analyses of variance (ANOVAs) confirmed that the age groups significantly differed on YALE Total S, $F(1,96) = 12.402$, $p = .001$, YALE Total E, $F(1,96) = 17.237$, $p < .001$, and YALE ACT Index, $F(1,96) = 7.862$, $p = .006$, with the young-old group scoring higher than the old-old group. There were no significant age group effects for tobacco or alcohol use. The analysis (Wilks criterion) also yielded a significant gender effect, $F(5,92) = 11.241$, $p < .001$. Univariate ANOVAs confirmed that males and females significantly differed on tobacco use with males using tobacco more often than females, $F(1,96) = 32.554$, $p < .001$, alcohol use, with males using more alcohol than females, $F(1,96) = 7.652$, $p = .007$, and YALE Total S, with females scoring higher than males, $F(1,96) = 7.363$, $p = .008$. There was no significant gender effect for YALE Total E or YALE ACT Index. There was no significant Age Group x Gender MANOVA interaction effect.

Social Network Characteristics

We then conducted a MANOVA on social network characteristics with age and gender as the independent variables and the social network characteristics as dependent variables (see Table 3). This analysis yielded non-significant main effects for age group and gender and a non-significant Age Group x Gender interaction effect. Thus, contrary to expectation males and females were equivalent in social network characteristics in this sample.

We conducted separate MANOVAs on each of the three physical health dimensions (self-perceived physical health, objective health status, and objective physical functioning) with age and gender as the independent variables. See Table 4 for a summary of physical health characteristics of the sample.

Self-Perceived Physical Health

The MANOVA conducted on self-perceived physical health showed a significant main effect of age group, $F(7,89) = 7.184, p < .001$. Univariate ANOVAs confirmed that the age groups significantly differed on health at the present time, $F(1,95) = 4.226, p = .043$, health prevents activities, $F(1,95) = 6.721, p = .011$, SF-36 PCS, $F(1,95) = 4.780, p = .031$, FSIA, $F(1,95) = 15.690, p < .001$, and FSID, $F(1,95) = 8.501, p = .004$, with the young-old showing better self-perceived health on all of these measures than the old-old. The age groups also significantly differed on health compared to others, $F(1,95) = 17.604, p < .001$, with the direction of the mean difference favoring the old-old who showed better self-perceived health compared to others than the young-old. Age groups did not significantly differ on FSIP. This analysis yielded a significant MANOVA main effect of gender, $F(7,89) = 2.653, p = .015$). Univariate ANOVAs confirmed that males and females significantly differed on health compared to others, $F(1,95) = 3.95, p = .05$), SF-36 PCS, $F(1,95) = 6.338, p = .013$, FSIA, $F(1,95) = 13.996, p < .001$, FSIP, $F(1,95) = 7.941, p = .006$, and FSID, $F(1,95) = 12.300, p = .001$, with males showing better self-perceived health on all of these measures than females. Males and females did not significantly differ on health at the present time and health prevents activities. The Age Group x Gender MANOVA interaction effect was non-significant.

Objective Health Status

The MANOVA on objective health status showed a significant main effect of age group, $F(3,94) = 3.508, p = .018$. Univariate ANOVAs confirmed that the age groups significantly differed on nights spent in hospital, $F(1,96) = 10.573, p = .002$, with the old-old reporting more nights spent in the hospital than the young-old. Doctor visits and days sick in bed were non-

significant. The main effect of gender and the Age Group x Gender MANOVA interaction effect were both non-significant.

Objective Physical Functioning

The MANOVA on objective physical functioning yielded a significant main effect of age group, $F(7,85) = 7.282$, $p < .001$. Univariate ANOVAs confirmed that the age groups significantly differed on the CS-PFP, $F(1,91) = 38.206$, $p<.001$, with the young-old showing better overall performance than the old-old. Age groups also significantly differed on each of the five subscales within the CS-PFP: upper strength, $F(1,91) = 41.207$, $p < .001$, upper flexibility, $F(1,91) = 27.505$, $p < .001$, lower strength, $F(1,91) = 39.221$, $p < .001$, balance and coordination, $F(1,91) = 24.972$, $p < .001$, and endurance, $F(1,91) = 33.198$, $p < .001$, with the young-old performing better on all of these measures of physical functioning than the old-old as expected. There was also a significant MANOVA main effect of gender, $F(7,85) = 6.307$, $p < .001$). Univariate ANOVAs confirmed that males and females significantly differed on the CS-PFP, $F(1,91) = 6.573$, $p = .012$, with males performing better on this measure of physical functioning than females. Males and females also significantly differed on four of the five subscales within the CS-PFP, upper strength, $F(1,91) = 18.022$, $p < .001$, lower strength, $F(1, 91) = 9.372$, $p = .003$, balance and coordination, $F(1,91) = 4.620$, $p = .034$, and endurance, $F(1,91) = 4.341$, $p = .04$, with males performing better than females on all of these subscales. There was no significant difference between males and females on upper flexibility. There was a statistically significant Age Group x Gender MANOVA interaction effect ($p = .03$), however, all of the ANOVAs yielded null results, so interpretational caution is warranted.

To summarize, the results presented so far indicate that the young-old had overall higher levels of exercise and physical health than the old-old, except that the old-old showed better self-

rated health compared to others. Regarding gender differences, results showed that males had higher levels of alcohol and tobacco use, exercise, self-perceived health, and objective physical functioning than females. In the next section, we explore the interrelationships among these variables using correlational analyses.

Phase 2: Relationships among Positive Health Behaviors, Social Network Characteristics, and Physical Health Dimensions

We used correlational analyses to address our first hypothesis in this section, which predicted that positive health behaviors and social network characteristics would be associated with higher levels of self-perceived health. Specifically, we conducted Pearson's correlations on the positive health variables: alcohol and tobacco use and exercise (three YALE subscales), the two dimensions of social network characteristics: perceived emotional support and social engagement variables (number of clubs and number of hours per week spent outside the home), and the self-perceived health variables: SF-36 PCS, health at present time, health prevents activities, health compared to others, and the three Katz subscales (FSIA, FSIP, and FSID). We expected to observe statistically significant correlations among positive health behaviors, social network characteristics and self-perceived health. Correlation coefficients appear in Table 5. As can be seen in Table 5, the health behaviors, alcohol and tobacco use, were not significantly correlated with social network characteristics or self-perceived physical health. Further, exercise (as indexed by the YALE Total E and ACT Index Scales) was correlated with both dimensions of social network characteristics. The YALE activity index was negatively correlated with perceived emotional support ($p < .05$), indicating that higher levels of activity were associated with greater satisfaction with emotional support. The YALE total energy expenditure index and YALE activity index were significantly positively correlated with the social engagement variable

hours spent outside the home ($p < .05$), indicating that higher levels of exercise were associated with more time spent outside the home. Exercise as indexed by the YALE was also correlated with some of the self-perceived physical health indices. The YALE activity index was significantly negatively correlated with health at the present time ($p < .05$), indicating that higher levels of activity were associated with better self-rated health. The YALE total energy index and the YALE activity index were significantly negatively correlated with health prevents activities ($p < .05$), indicating that higher levels of energy expenditure and activity are associated with less prevention of physical activities due to health problems. Importantly, social network characteristics were correlated with most of the measures of self-perceived physical health, in support of our first hypothesis. Perceived emotional support was positively correlated with health at present time, health prevents activities, health compared to others, FSIP, and FSID ($p < .05$), indicating that higher levels of satisfaction with social support are associated with higher levels of self-perceived physical health. Hours spent outside the home was negatively correlated with health at present time, health prevents activities, FSIA, FSIP, and FSID ($p < .05$), indicating that more time spent outside the home is associated with higher levels of self-perceived physical health. This relationship between social network characteristics and self-perceived physical health is consistent with previous research (Michael et al., 2000).

We used correlational analyses to address the second hypothesis in this section, which predicted that positive health behaviors and social network characteristics would be associated with higher levels of objective health status. Specifically, we conducted correlations on the positive health variables, the two dimensions of social network characteristics, and the objective health status variables (visits to the doctor in the past year, nights stayed in the hospital in the past year, and days sick in bed in the past year). We expected to observe significant correlations

among positive health behaviors, social network characteristics and objective health status. The only significant correlation we found was a positive correlation between the number of clubs and activities and the number of doctor visits in the past year ($p<.05$). Thus, our second hypothesis was not supported using the present indices of objective health status, which is a limitation in the present research.

We used correlational analyses to address our third hypothesis, which predicted that positive health behaviors and social network characteristics would be associated with higher levels of objective physical functioning. Correlations were conducted on the positive health variables, the two dimensions of social network characteristics, and the physical functioning variable (CS-PFP total score). We expected to observe significant correlations among positive health behaviors, social network characteristics and participants' level of physical functioning as indexed by the CS-PFP. As shown in Table 6, exercise as indexed by all three YALE subscales, the number of clubs, and hours spent outside the home were significantly positively correlated with CS-PFP scores ($p < .05$), in support of our third hypothesis.

To summarize, we found support for our first hypothesis, that positive health behaviors and social network characteristics would be associated with higher levels of self-perceived health. We did not find support for our second hypothesis, that positive health behaviors and social network characteristics would be associated with higher levels of objective health status. We also found support for our third hypothesis, that positive health behaviors and social network characteristics would be associated with higher levels of physical functioning. These results and their significance are further discussed below.

Discussion

Role of Age and Gender

In Phase 1 of our data analysis we examined the effects of age and gender on positive health behaviors, social network characteristics, and physical health. Regarding age differences, the results of Phase 1 indicated that for positive health behaviors, the young-old had higher levels of exercise than the old-old adults, but that levels of alcohol and tobacco use were not significantly different. This is surprising because higher levels of alcohol and tobacco use are associated with higher risk of mortality, and one might predict that older adults who have survived would be less likely to use these substances. However, this finding may be due to the criteria we used to assess alcohol and tobacco use. In the present study alcohol and tobacco use were assessed using three choices: current, former, and never. To more precisely measure alcohol and tobacco use one could assess the amount and frequency of alcohol and tobacco use (i.e., drinks per week or packs per week). There were no significant age differences in social network characteristics. This finding contrasts with Laura Carstensen's Socioemotional Selectivity Theory, which would predict a reduction in the breadth of social networks (i.e., fewer club memberships) with advanced age as older people view time as limited and are more selective in their choices of social interactions. With regard to physical health, the young-old had overall higher levels of self-perceived health, objective health status, and objective physical functioning. However, when asked to compare their health to others, the old-old had a higher level of self-perceived health that the young-old. This result is not surprising, in that participants are asked to compare their health to others in their age group. Given that those over age 85 in this study are survivors and likely comparing themselves to octogenarians who have died, their health status is obviously better by comparison. With regard to gender differences, the results of

Phase 1 indicated that males and females differed on positive health behaviors with males having higher levels of alcohol and tobacco use than females and females spending more time on exercise than men (as indexed by YALE Total S). Higher levels of alcohol and tobacco use in men may reflect a cohort effect. Because these participants are older, they may have been socialized when younger to view these activities as masculine, whereas younger adults today might show more gender equality in these activities. There were no significant gender differences in social network characteristics. This result is somewhat surprising, but one possible explanation may be selection bias. Although participants were randomly selected, people who agreed to participate may be more likely to seek social involvement even among men. With regard to physical health, males had overall higher levels of self-perceived health and objective physical functioning. As suggested by Wood et al. (2005), these differences in physical functioning may be due to older women's tendency to have lower body weight and strength than older men. However, there was no significant gender effect for objective health status.

Relationships among Positive Health Behaviors, Social Network Characteristics, and Physical Health Dimensions

In Phase 2 of our data analysis we examined the relationships among positive health behaviors, social network characteristics, and three dimensions of physical health. The results of this analyses indicated that our first hypothesis, that positive health behaviors and social network characteristics would be associated with higher levels of self-perceived health, was partially supported. The positive health behavior exercise was associated with both dimensions of social network characteristics. Higher levels of exercise were associated with more time spent outside the home (social engagement) and higher levels of satisfaction with perceived emotional support.

However, alcohol and tobacco use were not significantly associated with social network characteristics. There was also a relationship between positive health behaviors and self-perceived physical health. Higher levels of exercise were associated with better self-rated health and less prevention of activities due to health problems. However, alcohol and tobacco use were not associated with self-perceived physical health. As noted above, this outcome may be due to the criteria we used to assess alcohol and tobacco use. There was also a relationship between both dimensions of social network characteristics and self-perceived physical health. Higher levels of perceived emotional support were associated with overall higher levels of self-perceived health. Higher levels of social engagement as indexed by hours spent outside the home were also associated with overall higher levels of self-perceived health. Our results have replicated earlier findings that positive health behaviors and social network characteristics are associated with better self-perceived physical health and extended these findings to a broader age range including the oldest-old (Zunzunequi et al., 2004; Michael et al., 2000; Unger et al., 1999). Also of note is that our measures of self-perceived health have not been normed on older individuals. However, the high intercorrelations among our self-perceived health measures indicate that older individuals are able to assess their self-perceived health using these measures. See Table 5 for correlations and significance levels.

The results of Phase 2 indicated that our second hypothesis, that positive health behaviors and social network characteristics would be associated with higher levels of objective health status, was not supported. The only significant relationship we found was that more club memberships was associated with more doctor visits. This may be a spurious finding as the *r* value was very low ($r = 0.20$). That we were not able to extend research findings to include objective health status may be due to inadequate dependent measures for objective health status.

It is possible that the number of doctor visits in the past year, the number of days sick in bed in the past year, and the number of days as a patient in the hospital in the past year were not adequate indicators of objective health status. For example, some individuals may go to a doctor if they have a slight cold, whereas others might not go unless they are seriously ill. Also, it is possible that individuals may not be able to accurately remember the number of times they visited a doctor, were sick in bed, or stayed in the hospital in the past year. A better way to assess objective health status may be to assess the number and type of chronic diseases individuals have and the number of medications individuals are taking.

The results of Phase 2 indicated that our third hypothesis, that positive health behaviors and social network characteristics would be associated with higher levels of physical functioning, was partially supported. There were no significant relationships between positive health behaviors and social network characteristics. The positive health behavior exercise was significantly positively correlated with objective physical functioning. There was also a relationship between the social engagement dimension of social network characteristics and objective physical functioning as indexed by the CS-PFP. A higher number of club memberships and more hours spent outside the home were associated with higher levels of physical functioning as indexed by the CS-PFP. These results indicate that we not only replicated previous research that found relationships among positive health behaviors, social network characteristics, and self-perceived physical health, but also partially extended these findings to objective physical functioning.

Because this was a correlational research design it is not possible to infer causality. Although we found positive health behaviors and social network characteristics to be associated with higher levels of self-perceived health and objective physical functioning, we cannot assume

that one of these factors caused another. For example, individuals may be more socially engaged because their physical health allows them to or, conversely, being more socially engaged may contribute to better physical health. It is difficult to determine definite causality as it is impractical (possibly unethical) to manipulate individuals' levels of health behaviors or social network characteristics over time. Future research may benefit from the application of statistical techniques to address the contributions of positive health behaviors, social network characteristics, age, and gender to dimensions of physical health. For example, a series of hierarchical regression analyses could be conducted with indices of physical health as the criterion variable(s) and positive health behaviors, social network characteristics, age, and gender as predictor variables. Alternatively, one could use structural equation modeling techniques in an effort to pinpoint causal relationships among these variables. Given the constraints present in the dataset described previously, using the more advanced statistical techniques to address hypotheses concerning interrelationships among positive health behaviors, social network characteristics, physical health, age, and gender would not be appropriate here and remain a challenge for future research.

In conclusion, we replicated previous findings that positive health behaviors and social network characteristics are associated with higher levels of self-perceived health and extended these findings to include the oldest-old. A principle new finding emerging from the present investigation was the significant relationship between positive social network characteristics and objective physical functioning as indexed by the CS-PFP. Note, however, that we did not extend these findings to objective health status. Further research is needed to determine whether these findings could be extended to objective health status using more precise dependent measures.

Further research is also needed to determine the contribution of age and gender to the relationships among positive health behaviors, social network characteristics, and physical health.

This research has taken steps toward determining contributors to healthy aging and consequently discovering ways to promote successful aging. Through this line of research we may be able to reduce the proportion of older people suffering from health problems and improve quality of life in older individuals as well as benefit social programs by lessening financial strain on these programs.

References

Atchley, R.C. & Barusch, A.S. (2004). Social forces & aging: An introduction to social gerontology (10th ed.). United States: Wadsworth.

Avlund, K, Lund, R, Holstein, B.E., & Due, P. (2004). Social relations as determinant of onset of disabilities in aging. *Archives of Gerontology and Geriatrics*, 38, 85-99.

Baltes, M.M. & Baltes, P.B. (1990). Psychological perspectives on successful aging: The model of selective optimization with compensation. In *Successful aging: Perspectives from the behavioral sciences* (pp. 1-34). Cambridge: Cambridge University Press.

Bisschop, Kriegsman, van Tilburg, Penninx, van Eijk, & Deeg (2003). The influence of differing social ties on decline in physical functioning among older people with and without chronic diseases: The longitudinal aging study Amsterdam. *Aging Clinical and Experimental Research*, 15, 164-173).

Carstensen, L.L., Gross, J., & Fung, H. (1997). The social context of emotion. *Annual Review of Geriatrics and Gerontology*, 17, 325-352.

Carstensen, L.L., Isaacowitz, D.M., & Charles, S.T. (1999). Taking time seriously: a theory of socioemotional selectivity. *American Psychologist,* 54, 165-181.

Cress, M.E., Buchner, D.M., Questad, K.A., Esselman, P.C., deLateur, B.J., & Schwartz, R.S. (1996). Continuous-scale physical functional performance in a broad range of older adults: A validation study. *Archives of Physical Medicine and Rehabilitation*, 77(2), 1243-1250.

Cherry, K.E., & LeCompte, D.L. (1999). Age and individual differences influence prospective memory. *Psychology and Aging, 14*, 60-76.

DiPietro, L., Caspersen, C.J., Ostfeld, A.M., & Nadel, E.R. (1993). A survey for assessing physical activity among older adults. *Medicine and Science in Sports and Exercise*, 25, 628-642.

Folstein, M. F., Folstein, S. E., & McHugh, P. R. (1975). "Mini-Mental State": A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research, 12*, 189-198.

Jastak, J, & Jastak, S. (1965). Short forms of the WAIS vocabulary subtest. *Journal of Clinical Psychology, 20*, 167-199.

Jazwinski, S.M. (2001). Multidisciplinary Study of Longevity and Healthy Aging in the Louisiana Population. Research Grant Application to the LA Board of Regents Health Excellence Fund program.

Jette, A.M. (1980). Functional status index: Reliability of a chronic disease evaluation instrument. Archives of Physical Medical Rehabilitation, 61, 395-401.

Kinsella, K. and Velkoff, V., U.S. Census Bureau, Series P95/01-1 (2001). An Aging World: 2001 [Electronic Version].

Michael, Y.L., Graham, A.C., Coakley, E., & Kawachi, I. (2000). Health behaviors, social networks, and healthy aging: cross-sectional evidence from the nurses' health study. *Quality of Life Research*, 8 (8), 711-722.

Ostir, G.V., Simonsick, E., Kasper, J.D., & Guralnik, J.M. (2002). Satisfaction with support given and its association with subsequent health status. *Journal of Aging and Health*, 14 (3), 355-369.

Rowe, J.W. & Kahn, R.L. (1987). Human aging: Usual and successful. *Science*, 237, 143-149.

Rowe, J.W. & Kahn, R.L. (1997). Successful Aging. *The Gerontologist*, 37 (4), 433-440.

Seeman, T.E. (1996). Social ties and health: The benefits of social integration. *Annals of Epidemiology*, 6 (5), 442-451.

Seeman, T.E., Bruce, M.L., and McAvay, G.J. (1996). Social network characteristics and onset of ADL disability" MacArthur studies of successful aging. *Journal of Gerontology: Social Sciences*, 51B (4), S191-S200.

Seeman, T. & Chen, X. (2002). Risk and protective factors for physical functioning in older adults with and without chronic conditions: MacArthur studies of successful aging. *Journals of Gerontology*, 57B (3), S135-S144.

Sheikh, J. I., & Yesavage, J. A. (1986). Geriatric depression scale (GDS): Recent evidence and development of a shorter version. In T. L. Brink (Ed.), *Clinical Gerontology* (pp. 165-173). NY: Haworth Press.

Sherman, M. & Strope, L. (2004, March 24). Medicare predictions bleak: changes urged to save system. *The Advocate*, pp. A1, A4).

Tuljapurkar, S., Li, N., & Boe, C. (2000). A universal pattern of mortality decline in the G7 countries. *Nature*, 405, 789-792).

Unger, J.B., McAvay, G., Bruce, M.L., Berkman, L., & Seeman, T. (1999). Variation in the impact of social network characteristics on physical functioning in elderly persons: MacArthur studies of successful aging. *Journal of Gerontology: Social Sciences*, 54B (5), S245-S251.

U.S. Census Bureau. (2004, March 18). U.S. Interim Projections by Age, Sex, Race, and Hispanic Origin. Retrieved March 30, 2004, from http://www.census.gov/ipc/www/usinterimproj

Vaillant, G.E., Meyer, S.E., Mukamal, K., & Soldz, S. (1998). Are social supports in late midlife

a cause or a result of successful aging? *Psychological Medicine*, 28 (5), 1159-1168.

Walter-Ginzburg, A., Blumstein, T., & Modan, B. (2002). Social factors and mortality in the old-old in Israel: The CALAS study. *Journal of Gerontology: Social Sciences*, 57B (5), S308-S318.

Wechsler, D. (1955). *Wechsler Adult Intelligence Scale*. New York: Psychological Corporation.

Whitbourne, S.K. (2001). Adult Development & Aging: Biopsychological Perspectives. New York: John Wiley & Sons, Inc.

Wood, R.H., Gardner, R.E., Ferachi, K.A., King, C., Ermolao, A., Cherry, K.E., Cress, M.E., & Jazwinski, S.M. (2005). Physical function and quality of life in older adults: Gender differences. *Southern Medical Journal (manuscript accepted for publication)*

Zunzunegui M.V., Kone, A., Johri, M., Beland, F., Wolfson, C., & Bergman, H. (2004). Social networks and self-rated health in two French-speaking Canadian community dwelling populations over 65. *Social Science & Medicine*, 58 (10), 2069-2081.

Table 1

Background Characteristics

	Age	MMSE[a]	Vocab[b]	Years of Education[c]	GDS[d]	Marital Status[e]	Confidant[f]
				Young-Old (n=50)			
Males							
M	72.76	28.96	26.88	5.33	1.48	2.08	0.92
SD	5.28	1.21	5.59	1.17	1.71	0.40	0.28
Females							
M	72.08	29.12	24.48	4.92	1.6	2.76	0.92
SD	4.70	1.01	6.92	1.19	1.71	1.01	0.28
				Old-Old (n=50)			
Males							
M	91.36	28.04	22.16	4.68	2.25	2.84	0.88
SD	2.90	1.37	8.74	1.60	2.07	0.99	0.33
Females							
M	92.04	27.56	22.36	4.44	3.36	3.80	0.76
SD	1.79	1.64	6.38	1.33	2.80	0.71	0.44

Note. [a]Mini-Mental Status Exam. [b]Vocabulary (scores range from 0 to 40). [c]Years of education (1 = less than 7th grade, 2 = 7th to 9th grade, 3 = 10th - 11th grade, 4 = high school degree, 5 = partial college or specialized training, 6 = college degree, 7 = graduate degree). [d]Geriatric Depression Scale (scores range from 0 to 15 with a higher score indicating more depressive symptoms). [e]Marital Status (1 = never married, 2 = married, 3 = divorced or separated, 4 = widowed). [f]Confidant (0 = no, 1 = yes).

Table 2

Positive Health Behaviors

			YALE		
	Tobacco Use[a]	Alcohol Use[b]	Total S[c]	Total E[d]	ACT Index[e]
			Young-Old		
Males					
M	2.20	1.44	30.17	7162.80	43.64
SD	0.58	0.58	22.60	5333.67	22.85
Females					
M	2.76	2.04	46.64	8673.90	42.08
SD	0.44	0.89	25.80	4617.49	19.91
			Old-Old		
Males					
M	2.20	1.64	19.63	4171.56	35.17
SD	0.50	0.70	14.23	3579.55	20.84
Females					
M	2.76	1.92	26.70	4597.34	28.16
SD	0.44	0.95	21.76	3223.36	16.14

Note. [a]Tobacco Use (1 = current, 2 = former, 3 = never). [b]Alcohol Use (1 = current, 2 = former, 3 = never). [c]YALE Total S(the total time summary index in hours per week), [d]YALE Total E (the energy expenditure summary index in kilocalories per week). [e]YALE ACT Index (activity dimensions summary score; includes frequency and duration information).

Table 3

Social Network Characteristics

	Emotional Support	Social Engagement	
	Support Satisfaction[a]	Clubs[b]	Hrs. Outside Home[c]
	Young-Old		
Males			
M	1.24	1.20	2.80
SD	0.52	0.58	1.08
Females			
M	1.28	1.20	2.60
SD	0.54	0.58	1.15
	Old-Old		
Males			
M	1.16	1.20	2.64
SD	0.47	0.71	1.38
Females			
M	1.20	1.00	1.88
SD	0.41	0.41	1.13

Note. [a]Social Support Satisfaction (1 = very satisfied, 2 = fairly satisfied, 3 = a little satisfied, 4 = not satisfied). [b]Social clubs and organizations (0 = none to 3 = over 6). [c]Hours per week spent outside of the home (0 = none to 4 = over 19 hours).

Table 4

Physical Health Characteristics

	Self-Perceived Health				Health Status			Physical Functioning
	Present Health[a]	Health Prevent Act[b]	Health Comp[c]	SF-36 PCS[d]	Doctor Visits[e]	Days in Hospital[f]	Days Sick in Bed[g]	CS-PFP Total[h]
				Young-Old				
Males								
M	1.84	1.52	1.36	47.03	2.88	1.16	1.24	54.10
SD	.055	0.71	0.57	8.87	0.97	0.47	0.83	16.68
Females								
M	2.08	1.68	1.56	41.87	3.12	1.20	1.24	44.41
SD	0.57	0.69	0.51	10.37	1.13	0.82	0.88	13.93
				Old-Old				
Males								
M	2.20	1.80	1.00	42.53	3.28	2.08	1.32	34.13
SD	0.58	0.58	0.00	7.86	1.14	1.47	0.75	16.16
Females								
M	2.20	2.12	1.16	37.75	3.08	1.64	1.36	22.97
SD	0.65	0.73	0.47	11.67	1.19	1.15	0.86	18.22

Note. [a]Health at the present time on a 4-point Likert scale (1 = excellent to 4 = poor). [b]Health prevents activities (1 = not at all to 3 = a great deal). [c]Health compared to others (1 = better to 3 = poorer). [d]SF-36 Physical Health Composite Score. [e]Number of visits you have had to the doctor in the past year (1 = none, 2 = 1 to 3, 3 = 4 to 6, 4 = 7 to 9, 5 = over 10). [f] Number of nights you stayed as a patient in the hospital in the past year (1 = none, 2 = 1 to 3, 3 = 4 to 6, 4 = 7 to 9, 5 = over 10). [g] Number of days home sick in bed in the past year (1 = none, 2 = 1 to 3, 3 = 4 to 6, 4 = 7 to 9, 5 = over 10). [h]CS-PFP Total Score (0 - 100).

Table 5. Hypothesis 1 Pearson Correlations

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Tobacco Use	1.00***													
2. Alcohol Use	0.37***	1.00***												
3. YALE Total S	0.07	0.30**	1.00***											
4. YALE Total E	0.00	0.19	0.93***	1.00***										
5. YALE ACT Index	-0.03	-0.11	0.32**	0.45***	1.00***									
6. Perceived Emotional Support	-0.10	-0.02	-0.04	-0.08	-0.24*	1.00***								
7. Number of Clubs	0.03	0.03	0.07	0.08	0.04	-0.05	1.00***							
8. Hours Spent Outside Home	-0.15	-0.19	0.11	0.25*	0.31**	-0.16	0.14	1.00***						
9. Health at Present Time	-0.03	0.12	-0.06	-0.12	-0.34**	0.36***	0.02	-0.30**	1.00***					
10. Health Prevents Activities	-0.06	-0.04	-0.16	-0.23*	-0.26*	0.35***	-0.07	-0.37***	0.57***	1.00***				
11. Health Compared to Others	0.08	0.16	0.13	0.11	-0.08	0.34***	0.03	-0.10	0.34**	0.15	1.00***			
12. FSIA	0.09	-0.10	-0.25*	-0.36***	-0.40***	0.03	-0.13	-0.39***	0.21*	0.46***	-0.11	1.00***		
13. FSIP	-0.05	-0.12	-0.07	-0.17	-0.24*	0.29**	-0.15	-0.37***	0.28**	0.50***	0.21*	0.59***	1.00***	
14. FSID	0.01	-0.12	-0.17	-0.28**	-0.39***	0.23*	-0.12	-0.42***	0.29**	0.54***	-0.01	0.82***	0.79***	1.00***

Note. $*p < .05$, $**p < .01$, $***p < .001$

Table 6. Hypothesis 3 Pearson's Correlations

Variable	1	2	3	4	5	6	7	8	9
1. Tobacco Use	1.00***								
2. Alcohol Use	0.37***	1.00***							
3. YALE Total S	0.07	0.30**	1.00***						
4. YALE Total E	0.00	0.19	0.93***	1.00***					
5. YALE ACT Index	-0.03	-0.11	0.32**	0.45***	1.00***				
6. Perceived Emotional Support	-0.10	-0.02	-0.04	-0.08	-0.24*	1.00***			
7. Number of Clubs	0.03	0.03	0.07	0.08	0.04	-0.05	1.00***		
8. Hours Spent Outside Home	-0.15	-0.19	0.11	0.25*	0.31**	-0.16	0.14	1.00***	
9. CS-PFP	0.02	0.02	0.32**	0.42***	0.45***	-0.01	0.22*	0.29**	1.00***

Note. $*p < .05$, $**p < .01$, $***p < .001$