CARDIOVASCULAR PROBLEMS AS A PREDICTOR OF LATER COGNITIVE DECLINE:

MODERATING EFFECT OF SPOUSAL AND GENERAL SOCIAL SUPPORT

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Individuals are living longer now than they have in the past. As a result, there is an increased incidence in illnesses that are more prevalent in later life. One group of illnesses that is more prevalent is age related dementia. Alzheimer's disease (AD) and vascular dementia (VaD) are two common types of dementia found in the older adult population. Recent research suggests that these two types of dementia may both have a vascular component that is instrumental in their development. Not only may this vascular component be present in both these illnesses, but also it may be related to a more severe cognitive decline in the aging process. Results indicate that both cardiovascular disease and general and spousal social support in middle age are all three independent significant predictors of mild cognitive impairment and other non-normative cognitive impairment in later life. However, results do not indicate that social support moderates the relationship between cardiovascular disease and cognition.

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CHAPTER I

INTRODUCTION

The "graying of America" is the general term used to describe a stage of life that is becoming more common in first world countries. Because of better healthcare and nutrition, individuals are living longer. In the early part of the 20th century, most individuals were not expected to live past their late fifties or early sixties, and now it is common for most individuals to live well beyond this age. As a result there are many new medical and social issues to explore, and the study of aging has come to the forefront of scientific research in a number of fields, including sociology, psychology, medicine, and economics.

The United States defines the geriatric population, or older adult population, as individuals at or older that the age of 65. One measure of aging defined by Stuart-Hamilton (1994) is the features of young adulthood begin to transform into the features of old adulthood. This, of course, can happen at very different ages, depending on the individual, his or her genetic makeup, and health issues. Despite these individual differences, there are normative changes and declines, with few exceptions, for older individuals.

Features of Normal Aging

In normal aging, there is often a decline in many systems of the body. The cells of muscle and skin tissue are less efficient at reproduction, causing the skin to be less elastic and less efficient at self-reparation. Cardiac and pulmonary function is less efficient causing less oxygen to get to the brain, which causes an overall slowing of the system as well as an overall slowing of cognition and aging of the brain.

The sensory organs are often less efficient, with vision having normative changes that involve difficulty focusing and refocusing at different distances, with a tendency toward long

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sightedness. Most people find that they have difficulty with the sharpness, or acuity, of vision and find that many images are not seen in as sharp detail as they once were. Many individuals also experience a decrease in hearing. This often begins with the inability to hear faint noises and often declines to an inability to distinguish a particular voice in an environment of background noise. Older adults also have mild declines in touch, taste, and smell (Stuart-Hamilton, 1994). In addition, many systems and parts of the body begin to wear out simply as a function of use. For example, many older adults find that they have to have knee or hip replacements. Similarly, many older adults have dentures or problems with their teeth.

<center>Dementia</center>

Although there is a normative cognitive decline in aging, as the population is living longer, dementia has become an increasingly common diagnosis. Dementia is a non-normative pathological change in cognitive functioning. It is described by the Diagnostic and Statistical Manual of Mental Disorders Edition 4-Revised (DSM-IVTR) as "... a clinically significant deficit in cognition that represents a significant change from a previous level of functioning" (American Psychiatric Association, 2000, p.135). Dementia is often distinguished from other transitory cognitive impairments because of its effect on memory and attention as well as the permanent and terminal nature of its course (American Psychiatric Association 2000).

In the beginning stages of dementia, it is often difficult to determine whether an individual is experiencing normal age-related cognitive decline or the beginning of significant cognitive dysfunction. A functional assessment by a neuropsychologist is the standard procedure to determine deficits and diagnosis. Neuropsychological tests are used determine deficits and whether the pattern of these deficits is common to a particular type of dementia or is a reflection of normal aging or other pathology. Symptoms that the professional looks for may include:

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apraxia, aphasia, and agnosia; as well as problems with recognition, recall, social judgment, and attention (American Psychiatric Association 2000). It is important to note that although any of these symptoms may reflect a deficit; this does not necessarily merit a diagnosis of dementia. Neuropsychology and the neuropsychologist's role in the diagnosis and treatment of dementia is further discussed later in the paper.

There are several types of dementia. Although many share common symptoms, there are specific patterns of symptom presentation that differentiate them. These particular patterns are often obvious in the early stages of the disease, but may blur as the disease progresses. The progression of functional decline may indicate type and severity of the illness. Despite this, the blurring of symptoms as the illness progresses can make accurate diagnosis of type of dementia difficult for the clinician, especially if the patient is seen at a later stage of the illness.

Thus, early detection and diagnosis is often important for the most efficacious treatment of the patient. Although treatment of dementia is limited, early detection can allow for prescription of cognitive enhancing medication, as well as behavioral and environmental interventions. In addition, it can give the patient time to put his or her affairs in order and make decisions for him or herself that may have to be made by others if diagnosis were made in later states of the disorder.

Patients and family members may be the first to observe memory deficits and behavioral symptoms. Although the patient may notice and report some mild memory problems, he or she may be unaware of the severity or significance of these symptoms. Many elderly patients attribute dysfunction to "normal aging." If the patient is aware of the deficits, he or she may be afraid or depressed at the possible diagnosis or prognosis, and therefore may hide or ignore symptoms. Because of these reasons, patients often do not come in of their own volition for

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testing, but usually agree to test at the request of a family member or the referral of a physician (Stuart Hamilton 1994).

Family members often notice common behaviors from the older adult suspect of cognitive deficits. Individuals with dementia often have difficulty learning new material and may forget previously learned material. In the early stages of dementia, they may misplace items such as keys, purses, or wallets. They may become disoriented or lost in familiar areas, and often forget the names of close friends or family members. Later stages, which usually manifest long after diagnosis, are characterized by severe declines in physical and cognitive functioning. In these stages, individuals often forget spouses and close family members and have difficulty with basic activities of daily living such as bathing, grooming, and feeding themselves (American Psychiatric Association, 2000).

Alzheimer's disease, Vascular dementia, and their Interrelationship

Although, there are several types of dementia, the two most commonly diagnosed age-related dementias are dementia of the Alzheimer's Type (AD) and vascular dementia (VaD).

AD is characterized by functional deficits affecting many different areas of the brain involved with memory, attention, and social judgment. Onset is gradual with a steady decline of cognitive and physical functioning. In AD, the patient is often unaware of the presence or severity of deficit. The likelihood of a diagnosis of dementia increases as the individual ages. "The prevalence of Dementia of the Alzheimer's Type increases dramatically with increasing age, rising from .6% in males, and .8% in females at age 65, to 11% in males and 14% in females at age 85 . . . by age 95, the prevalence is 36% in males and 41% in females." (American Psychiatric Association, 2000, p. 156).

VaD, although still an age-related dementia, is commonly diagnosed in individuals in

their late fifties. Disease progression in VaD is different from AD. AD has a steady, sloping, downward decline while VaD has a stepwise progression. This stepwise progression presents as a pattern of functional "plateau" with a severe drop in cognitive and physical functioning down to another plateau. This pattern continues until VaD begins to display more global deficits in functioning, resembling the pattern of AD. In the early stages of the VaD, functional deficits are focal in nature, generally reflecting the area if the brain that has been damaged. In early stages, the patient is often able to compensate for deficits, and may exhibit depression or anxiety in response to noticeable deficits. However, as the disease progresses, and begins to mimic that pattern of AD, the patient often becomes completely unaware of the presence or severity of these deficits.

Individuals who display symptoms of VaD often have a history of heart disease, stroke, or other types of vascular illness. Yamada, Kasagi, Saski, Masunari, Mimori, and Suzuki (2004) studied Japanese elders with VaD and AD and found that history of stroke was predictive of VaD. Magnetic Resonance Imaging (MRI's) of individuals with VaD often reveals scar tissue or weakened venous walls. An individual may or may not report a history of vascular incident; however, mild infarcts or transient ischemic attacks often occur outside the individual's awareness. Many times these incidents are do not display functional deficits at the time of damage, but may correlate with symptoms of VaD later.

The similar presentations at later stages of both disorders have led researchers to explore comorbid and etiological factors that may coincide within the two dementias. One possibility is that individuals may have both types of dementia concurrently. Lopez, Kuller, Fitzpatrick, Ives, Becker, and Beauchamp (2003), evaluated prevalence and frequency of dementia in the Cardiovascular Health Study. This longitudinal study examined 3608 individuals over the age of

65. In this study, researchers found that 16% of participants presented with both AD and VaD, It is questionable how they could tease out this diagnosis, but this finding are an example of how researchers suspect that both disorders could have similar etiology.

This can be taken a step further and by exploring the possibility that the two disorders may be different stages of the same illness. Norris, MacNeill, and Haynes (2003) report that when they looked at autopsy studies, as far as physiopathology, brains of the patients with VaD looked similar to brains of patients with AD.

The researchers suggest that many dementias that were diagnosed as VaD were actually AD in the early stages. Even though global impairment of cognitive functioning has been the traditional hallmark of AD onset, recent research suggests that that this type of rapid global decline may exist relatively later in the disease process. It is suspected that there has been pre-existing cognitive decline and that is less obvious and more stable prior to the diagnosis (Christensen, Dear, Anstey, Parslow, Sachdev, & Jorm 2005).

This research suggests that most individuals who are diagnosed with AD are diagnosed in the later stages of the illness when a more global impairment is seen. If tested sooner, this illness may look a great deal more like what is now considered VaD, with more focal damage present. This idea gives pause to the possibility that not only are these two dementias the same, but it is also likely that they both stem from the same vascular problems.

This hypothesis is further supported by many researchers finding vascular risk factors in many AD patients. Feigin (2003) suggests vascular risk factors play a part in AD, by contributing to the severity of the illness. She reports "..current evidence suggests that vascular risk factors, such as hypertension, coronary heart disease, atrial fibrillation, diabetes mellitus, smoking, ischemic white matter lesions, blood-brain barrier dysfunction, and generalized

atherosclerosis, may play a role [in dementia]. Data suggest that cerebrovascular disease and vascular risk factors may exacerbate Alzheimer's disease and vice versa" (Feigin, 2003, p. 237).

Research with magnetic resonance imaging (MRI) supports these findings. Kuller et al. (2003) examined 3608 participants using MRI. They found that ventricular atrophy, increased white matter (or scar tissue), and number of brain infarcts were strong predictors of VaD and AD. These two studies support the idea that vascular problems may contribute to both VaD and AD.

If vascular problems do indeed contribute to the development of these two age-related dementias, it is likely that vascular problems are related to cognitive decline that is a precursor to the dementia. Verhaegen, Borchelt, Geriatriezentrum, and Smith (2003) did both a cross sectional and longitudinal study in an elderly population controlling for age, socioeconomic status (SES), sex and dementia status. They examined specific aspects of memory and attention and found that "4 diagnoses were negatively associated with cognition: congestive heart failure, stroke, coronary heart disease, and diabetes mellitus…" (Verghegen et al., p. 559). This study suggests that diseases with vascular components play a strong role in cognitive dysfunction.

Mild Cognitive Impairment

Mild cognitive impairment (MCI) is said to be the pre-existing condition found before a diagnosis of an age-related dementia. It is the recent subject of much research and clinical interest. According to a definition by Davie, Azuma, Goldinger, Connor, Sabbagh, and Silverberg (2004), "MCI is generally characterized by episodic memory impairment with relative sparing of other cognitive functions" (p. 269). These patients often show hippocampal atrophy, that is more than that of normal aging, but not as severe of atrophy found in patients diagnosed with AD. Research indicates within 6 years of a diagnosis of MCI, 80% of individual's

diagnosed convert to AD (Davie, Azuma, Goldinger, Connor, Sabbagh, and Silverberg, 2004).

These findings have staggering implications for psychologists and physicians alike. There is the initial implication, that if found early enough, pharmacological interventions such as cognitive enhancing agents or behavioral interventions, such as "mental aerobics" can be used in an attempt to delay the onset of AD, and therefore slow the progression of the illness. An additional implication is the numbers. If 80% of patients diagnosed with MCI convert to AD, when do the other 20% convert, or do they convert at all.

Fernandez-Ballesteros, Zammarron, Tarraga, Moya, and Inugues (2004) report that not all patients who are diagnosed with MCI develop dementia. These researchers suggest that MCI may be an entity unto itself, causing only a vulnerability to dementia. This possibility seems to have several interesting implications. The possibility that these researchers put forth, that MCI is an entity in itself, may suggest that this disorder may need to be treated separately. If MCI can be detected, it may be likely that there are interventions that can prevent or inoculate individuals from the subsequent vulnerability to AD.

There is also another possibility. It may be that individuals who have been diagnosed with cognitive impairment have a protective factor, whether a gene or lifestyle factor, that is preventing the further progression into AD. This implication is staggering, particularly if there is something in their lifestyle that is helping these individuals avoid the further downward progression.

It is also possible that this particular subset is being misdiagnosed. Individuals experience minor cognitive impairments for many reasons. Someone who is bereaved will likely look impaired for quite a while. There has also been evidence found that individuals under extreme amounts of stress or who are sleep deprived display a great deal of memory and attentional

difficulties, all of which seem to disappear once the stressor is removed or the patient becomes rested. Therefore, it is important when any diagnosis of cognitive impairment is being made, that all of these factors be taken into consideration.

Depression as Differential Diagnoses

 Diagnosis of dementia is complicated and may be further complicated by pre-existing psychiatric disorders. A primary diagnosis that is often confused with dementia or mild cognitive decline is depression. This can be particularly difficult for inexperienced clinicians because depression often presents differently in older adults than in a younger cohort. Therefore, it is important that the diagnostician use the correct measures for assessment as well as understanding the nature and presentation of depression in this population.

However, it is important to note that depression can often be a side effect of a dementia or mild cognitive decline. This is often the case in individuals who are aware of their deficits. They will often experience a reactive depression to the cognitive decline that they are experiencing. This is often a form of grief at the loss of functioning and fear of what the deficits might mean as far as diagnosis and possible nature of the disorder.

In some neurological disorders, depression is often seen as a predisposing symptom of the disorder. Although this is rare, it can often be seen in dementias that are associated with Parkinsonism or Lewey Bodies. This symptom is often seen early on, before any of the physical or cognitive symptoms of the disorder present themselves.

As shown above, cognitive impairment can be due to many things from psychological disorders to sleep deprivation. This is why it is important for the clinician to be well versed in all of the possibilities, and be familiar with the specific population, cohort, as well as common psychiatric and organic illnesses found within this population. Although there are many

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disciplines that can initially suspect the presence of a dementia, as stated above, it has traditionally fallen to the field of psychology, specifically the subspecialty of neuropsychology for diagnosis and clarification of type, severity, and functional deficits of dementia.

Neuropsychological Assessment and Cognitive/Functional Domains

Ideally, the neuropsychologist should be intimately familiar with both neurological and psychological disorders, as well as the social and biological aspects of each in order to distinguish complicating factors and comorbidities in order to determine a proper diagnosis of dementia. There are many factors that go into determining this diagnosis.

As described by Hebben & Millberg (2002), traditionally the neuropsychologist begins by "describing and identifying changes in psychological functioning (cognition, behavior, emotion) in terms of presence/absence and severity" (p. 6). This area mainly focuses on whether there is a basic change in cognitive functioning and if that basic change is pathological or severe enough to be related to a dementing process. The clinician uses clinical interview and neuropsychological tests to determine current deficits and strengths of the client and whether they represent a change from premorbid functioning.

Next, the neuropsychologist determines "the biological (i.e., neuroanatomical), physiological correlates of test results: detection, gradation, and localization of brain damage" (p. 6). This is likely more relevant to the traditional VaD diagnosis where presentation of decrease in function is more focal in nature. In this situation, the neuropsychologist will determine where, or if, vascular damage has taken place focally, the location of the damage and what deficits are present as a result of that damage.

The third step, according to Hebben & Millberg, is "determining whether changes are associated with neurological disease, psychiatric conditions, developmental disorders, or

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nonneurological conditions" (p. 6).   This aspect of clinical neuropsychology asks the clinician to use his or her knowledge of both medical and psychological issues to determine if the change in cognition being exhibited is related to a dementing process, stroke, lesion, or other origins.

This part of testing often includes identifying any possible psychopathology such as depression or anxiety that may be contributing to or causing change in cognition. This might include using diagnostic personality measures, depression screenings, or projective tests to determine the presence of psychopathology and the extent to which this psychopathology may be causing or contributing to deficits. It is important to note that just because an individual is displaying psychological symptoms, does not mean that he or she does not have neurological deficits. Many neurological disorders show comorbidity with mood disorders, and some mood disorders are precursors, or symptoms of an underlying neurological disorder.

A fourth factor contributing to a neuropsychologist's diagnosis is "assessing changes over time and developing a prognosis" (p. 7).   This particular aspect of testing is particularly important to individuals with dementia. The neuropsychologists will often determine a baseline at time of diagnosis and reassess every twelve to eighteen months as is beneficial for care of the patient. This will often give the physician and family the opportunity to understand the rate of decline and help to determine when particular medical, behavioral, and environmental interventions are useful.

Having made a diagnosis, a neuropsychologist then turns to what it means for the family, in terms of long term planning and goals. The neuropsychologist offers "guidelines for rehabilitation, vocational/educational planning, or a combination of these" (p. 7). In the case of dementia or cognitive impairment, the neuropsychologist will often give strategies or recommendations to the patient that help them to remain physically

and mentally active. This can help the patient to either retain current functioning longer and/or improve the quality of life.

Also, the neuropsychologist provides "guidelines and education for family and caregivers" (p. 7) The neuropsychologist will often work to help educate family members and caregivers about the dementing process and how this relates to the patient. They will also try to explain the particular neurological disorder and the nature of this disorder to the family and caregivers, give them recommendations on how to deal with possible complications that may arise, and offer psychological services for any emotional or reactive psychological symptoms that might occur as a result of the diagnosis.

This instrumental social support can be extremely important for the caregivers, as they are often significantly affected by the changes that are required to care for a patient with dementia. Research has found that caring for a relative who has dementia is related to high levels of stress and depression in the caregiver (Stuart-Hamilton 1994).

Lastly, a neuropsychologist plans "for discharge and treatment implementation" (Hebben & Millberg, 2002, p. 6). This can include, but is not limited to anticipating medical coherence difficulties, environmental management, and anticipating psychiatric/psychological correlates to the diagnosis. Often a neuropsychologist will work with the family and a social worker to help implement possible environmental changes that will be beneficial for both the care of the patient and family.

Neuropsychological Domains and Tests for MCI and Dementias

Neuropsychological testing of dementing illnesses and MCI tend to focus on the neuropsychological domains of memory, attention, language, visual spatial skills, and motor skills. Although AD and MCI tend to show deficits in many domains of functioning, the greatest

deficits tend to be found in memory. Fernandez-Ballesterosm, Zamarron, Tarraga, Moya, and Iniguez (2003) report that performance on memory tests such as immediate and delayed recall is some of the strongest predictors of AD. Similarly, tests that focus on memory are often the most useful in MCI. However, it is important to note that there are usually minor declines on tests of word-finding and abstract reasoning. It is also important to note that the memory functions that seem to be affected in MCI and AD are those that deal primarily with recent memory, or recently learned information.

<p style="text-align:center">Cardiovascular Disease</p>

As explored above, vascular factors seem to play a key role in age-related dementias and non-normative age-related declines in cognition. Therefore, it makes sense to look into vascular disease, its etiology, prevalence, and influences as a point to begin to explore the possible causes and prevention of these age-related illnesses. Vascular disease is not only the most common disease in the United States, vascular diseases of the coronary, central and peripheral circulatory systems are the most common diseases in the world. Although vascular diseases can affect individuals of all ages, it is most commonly diagnosed in men and women who are middle-aged (Kazarian, Evans, & Evans 2003). There are many factors that contribute to a diagnosis of vascular illness. Although genetics may play a key factor, behavioral life-style factors such as smoking, exercise, and diet play a major role in the development of the vascular diseases. These lifestyle factors are particularly relevant to cardiovascular disease.

Health Behaviors and Cardiovascular Disease

Health behaviors play a key role in prevention, maintenance, and severity of cardiovascular disease. Carmelli, Swan, Wolf, and Decarli (1999) studied male twins aged 45-56, and discovered that health behaviors that differed within each set of twins were often the

determining factor in who developed cardiovascular disease and who did not. These researchers report that the twin that consumed more alcohol, smoked, and engaged in other negative health behaviors was the one that reported a diagnosis of cardiovascular disease. This study, which controls for genetic and biological factors, indicates that negative health behaviors are likely the key causal factor for a diagnosis of cardiovascular disease.

Although health behaviors are key, it is also necessary to understand what influences these behaviors. The individual's perceptions and attitudes about health behaviors often have a profound effect on whether or not the individual will engage in preventative behaviors or change existing behaviors. Meischke et al., (2000) found that individuals who had poorer health perceptions, more risk factors, and increased knowledge about cardiovascular disease were at increased risk for acute myocardial infarction.

Individuals that have poorer health perceptions may often feel that changing their health behaviors would have little benefit on their current health; therefore, they do not change their current health behaviors. Maintaining the negative health behaviors that contribute to cardiovascular disease maintains and increases the severity of the disease, increasing the negative health effects of the disease.

Not only do negative health perceptions have a negative effect on health behaviors, but unrealistically optimistic health perceptions may also have a negative impact on health behaviors. Davidson and Prkachin (1997) reported that individuals diagnosed with cardiovascular disease who were unrealistically optimistic were most likely to decrease a new exercise program over a six-week period compared to individuals that were more realistic in their health perceptions about heart disease. These unrealistically optimistic participants also showed the smallest increase in knowledge after a cardiovascular disease prevention lecture.

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It is possible that individuals who display unrealistic optimism do not understand the severity or possible danger of the disease. If they do understand it, they may feel that the negative effects are not applicable to them. Support for this idea was found in research by Han (1997) who studied college students' perceptions of risk factors for heart disease based on past health behaviors. The researcher found that college students who smoked in the past and currently smoked did not perceive their health risks as any greater for cardiovascular disease than individuals who did not smoke. However, the individuals who smoked reported that their peers, who engaged in the same health behaviors, were at a greater risk for cardiovascular disease than they were.

There are many factors that influence individual's perception of their health. Psychological illness such as depression and anxiety often influence the individual's perception of his or her life through cognitive distortion. It is likely that this cognitive distortion extends to health behaviors and how they affect physical and emotional health.

Psychological Illness and Health Behaviors

Many psychological symptoms contribute to negative health behaviors that may contribute to a diagnosis of cardiovascular disease. Schwartzman and Glaus (2000) report that women who report symptoms of depression are at a higher risk for cardiovascular disease than women who do not report symptoms of depression. This occurrence is probably due to the increase in negative health behaviors that are frequently associated with depression, including smoking and consumption of alcohol. In addition, individuals who are depressed often report either overeating or under eating; either insomnia or hypersomnia; and little physical exercise.

In addition to findings on depression, Kubansky, Kawaguchu, Weiss, and Sparrow (1998) report that "Epidemiological evidence suggests that anxiety may be a risk factor for the

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development of CHD [coronary heart disease]. Chronic anxiety may increase the risk of CHD by a) influencing health behaviors (e.g. smoking); b) promoting atherogenesis (e.g. via increased risk of hypertension); and c) triggering fatal coronary events through arrhythmia, plaque rupture, coronary vasospasm, or thrombosis" (p., 47).

Although some psychological symptoms may precede and contribute to a diagnosis of cardiovascular disease, it is also common for a diagnosis of a cardiovascular disease to elicit reactive psychological symptoms in an individual. Because of the preventative nature of cardiovascular disease, many individuals have some measure of self-blame after diagnosis. This self-blame often causes feelings of guilt and worthlessness that may lead to depression. Other common emotions are anger or a lack of control, which can lead to feelings of anxiety. These feelings then have a negative effect on health behaviors, which then, in turn, influence the progression of the disease.

An important factor that has been reported to act on psychological symptoms and attitudes of health behaviors is social support. A lack of perceived social support can be detrimental to individuals with a cardiovascular disease. Orth-Gomer, Chesney, and Wenger, (1998) report that social isolation plays an increased role in cardiovascular disease in women by acting on depressed mood and health behaviors.

<div align="center">Social Support</div>

Social support has been indicated as a protective factor in many psychological and physical illnesses. Seeman (2000) reports that "Protective effects of social integration with respect to mortality risk are the most thoroughly documented, although protective effects have also been documented with respect to risks for mental and physical health outcomes and for better recovery after disease onset (pg., 362)"

This premise seems to be especially true for cardiovascular disease. Standfield and Fuhrer (2002) examined epidemiological studies on social support and chronic illness and found that "In these studies, lack of social networks and social isolation predict increased mortality risk in comparison with those who are not socially isolated, the influence often operating over long periods of time. There is also influence of specificity of the risk to increased cardiovascular disease…" (p.,72).

Shen, McCreary, and Myers (2004) studied 142 patients with cardiovascular disease who were participating in a cardiac rehabilitation program. They found that individuals who reported higher levels of social support had better post treatment physical functioning than individuals who reported lower levels of social support. They also found that these individuals used more positive coping skills when dealing with the psychosocial issues surrounding their illness.

It is most likely that social support acts on the illness by acting on health behaviors that affect the illness. Because of the chronic nature of the disease, appropriate management of diet, weight and exercise can improve the prognosis of cardiovascular disease. Gallant (2004) supports that social support acts on the management of cardiovascular disease. This researcher reports that there is a positive relationship between social support and managing the illness.

Although social support is generally beneficial to the prognosis of cardiovascular disease, depending on the nature and perception of the support relationship, it may not always benefit adjustment to illness. A study by Gallant (2002) indicates that social support can have a negative influence on the management of health behaviors. This is often the case if the individual's social support system is surrounded by negative health behaviors.

For many individuals, their spouse is the most important and influential relationship in their lives. The spouse may also have a major influence on health behaviors of the individual

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diagnosed with cardiovascular illness by influencing health behaviors.

The Influence of Marriage

The nature of spousal support does not change simply because an individual is diagnosed with a chronic illness. If the partner was supportive before the illness, he or she is likely to be supportive after the diagnosis, but if her or she was not supportive before the illness, it is unlikely that he or she will become supportive after diagnosis (Shen, McCreary , & Myers, 2004). Therefore, quality of the relationship seems to have a significant impact on whether spousal support acts as a protective factor. The more satisfied partners are with their spouses, the more positive the influence of the relationship is on the illness.

Franche et al. (2004) studied cardiac patients and illness intrusiveness. They found that men who reported more satisfaction with their partners at diagnosis, reported less illness intrusiveness one year later than men who reported less satisfaction with their partners. Not only did this perception influence psychosocial adjustment, but it influenced physical health as well. Broodwell (1999) reports that men who reported higher levels of spousal and family support had lower systolic and diastolic blood pressures that men who reported low levels of spousal and family support.

Although many studies show that high levels of spousal support can be beneficial for individuals with cardiovascular disease, there are studies that indicate that high levels of social support can be detrimental to patients if the spouse is reinforcing the individual for illness related behaviors. Hong (2002) found that cardiac patients who displayed high levels of social support expressed less improvement in cardiac rehabilitation than individuals that reported low levels of social support. The researcher's explanation for these results was, " Results are consistent with an operant conditioning model and suggest that positive attention from significant others

contingent on expression of CHD [cardiac heart disease] symptoms may unwittingly serve to reinforce symptom occurrence and expression, concomitant disability, and emotional distress" (p.,19).

Since social support plays such a key role in cardiovascular disease, it is beneficial to return to the discussion of cognitive decline and explore how and if social support acts on age-related dementia and non-normative cognitive decline,

Social Support and Cognitive Decline

Social support also plays a key role in dementia and cognitive decline. Kristjansson, Breithaupt, and McDowell (2001) report, "Lack of social support is an important risk factor for disability, psychiatric illness, cognitive impairment, institutionalization, and mortality" (p., 125). Ficker, MacNeill, Bank, and Lichtenburg (2002) studied cognitively impaired elders and found that they reported significantly less social support than their cognitively intact counterparts.

Spousal support can be especially important in a diagnosis of dementia. This may be because of the progressive functional decline that occurs with this disease. With a diagnosis of dementia, the individual who most often offers the most frequent and intense level of instrumental and emotional support is the spouse of the patient. Berg-Werger, Rubio, and Tebb (2000) report that spouses make up half of all caregivers. Mui (1995) states that when one spouse is disabled, if the other spouse is able, he or she often becomes the primary caregiver of the disabled partner.

Social and Spousal Support as a Moderator

The above-mentioned research explains how social support, both general and spousal, often act on health behaviors to influence cardiovascular disease and cognitive decline. Because of the influence that social support has on health behaviors, social support is most likely a strong

moderator between health behaviors and cardiovascular disease.

Because of this influence on health behaviors, it is likely that after an individual is diagnosed with cardiovascular disease, the amount and quality of social support that he or she has will influence the progression of the illness. The progression and resulting severity of the cardiovascular disease will, likely influence the presence and severity of cognitive decline in later life. In other words, if the social support has a positive influence on health behaviors, which may lessen the progression and damage done by the vascular illness, it is likely that cognitive decline will not be as severe than it would be if the individual did not have the moderator of social support to act on health behaviors. Therefore, social support is likely also a moderator of the relationship between cardiovascular disease and cognitive decline.

It is most likely that spousal support is a more influential moderator because of the intimacy of the marital relationship. The spouse is the closest relationship to the patient and most likely will be the most influential social support relationship. As a result, the spouse is most likely highly influential on health behaviors.

<center>Research Question and Hypotheses</center>

Many studies have revealed that there is a relationship between vascular problems in middle age and age related dementias (AD and VaD). However, as cited above in the MCI section, many individuals begin showing significant cognitive decline years before they are ever diagnosed with a dementia. This study examines a spectrum of non-institutionalized individuals at the ages of 51-61 and then again at the ages 61-71. Because of the ages at which these individuals are studied, cognitive decline will be examined approximately four years before a diagnosis of VaD or AD is commonly assessed, but at the common age of an assessment of MCI. In addition, research has shown that cognitive decline before a diagnosis of age related dementia

can be found 5-10 years before actual diagnosis (Fratiglioni, Small, Winblad, & Backmena 2001). Therefore, this study will examine cardiovascular disease in middle age and see if is has a predictive relationship with symptoms of MCI or other non-normative age related cognitive decline in later life, which, as shown above is frequently predictive of subsequent age-related dementia.

This study examines the relationship between cardiovascular disease and its influence on cognitive decline across a ten-year period. It also examines the roles of general social support and spousal support potential moderators of the relationship between these two variables. In addition, self-reported health, life satisfaction, and health behaviors will be examined as a covariates to determine the level of influence that they have on the relationship of cardiovascular disease and cognition.

The researcher predicts that cardiovascular disease in middle age will account for a significant amount of the variance of cognition in later life and that social support will act as a significant moderator between these two variables, with spousal support having a stronger influence than general social support. It is also predicted that self-reported health, life satisfaction, and health behaviors will act as a significant covariate to cardiovascular disease and its influence on cognition later in life. It is also hypothesized that individuals who are married will look significantly different as far as cognition than individuals who are not married. A visual representation of the model is included in the Appendix (See Figure 1).

CHAPTER II

METHOD

Participants in HRS Data Sets

Participant data was taken from the Health and Retirement Study (HRS) Public Data Set from the University of Michigan (HRS documentation report, 2002) (The HRS (Health and Retirement Study) is sponsored by the National Institute of Aging (grant number NIA U01AG009740) and is conducted by the University of Michigan). At the beginning of data collection in 1992, the data set researchers took a representative sample of the United States of America population aged 51-61. The researchers subsequently interviewed the same participants every two years.

The researchers administered questionnaires related to income, employment, family, and health. The questionnaires were administered in verbal interview format. They were administered via phone, or in person. The researchers 100% over sampled the African American and Hispanic population in this age group and the State of Florida population in this age group. The over sampling of the African American and Hispanic population was to encourage researchers to study cross cultural issues found in these populations (HRS documentation report, 2002).

Measures

Measures were taken from the 1992, 1996, and 2002 interviews. Covariate measures include: a measure of self reported health, a health behavior index, and a measure of life satisfaction. Because of methodological issues reported below, spousal social support was only available in the initial 1992 Wave. However, it was still included in the multiple regression (moderator) analysis. Measures across time include: a heart disease index, a general social

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support measure, and measures of cognitive functioning.

Measure of Self-Reported Health

The measure of Self-Reported Health includes a question that was asked at the 1992 interview and used as a covariate for this study. This item asked participants to rate their current health. The item was reverse scored as necessary so that a higher score indicate better health (See Appendix A).

Health Behavior Index

The health behavior index includes questions that were asked at the 1992 interview. This index includes questions related to heath behaviors such as smoking, alcohol use, and exercise. They also include a measure of body mass index. Items were reverse scored as necessary so that higher scores indicate better health behaviors. In the case of alcohol use 1-2 drinks was set equal to no drinks as there has been previous research that indicates a minimal amount of alcohol each day can benefit health. In addition, each section was divided into a sub-index so that results from particular health behaviors could be analyzed. These sub-indexes are separated into smoking, alcohol use, exercises, and obesity. Items were reverse scored as necessary so that higher scores indicate better heart health behaviors (See Appendix B).

Measure of Life Satisfaction

The Life Satisfaction Scale was taken from the 1992 interview. Items ask the participant to rate levels of satisfaction with different areas of his or her life. This scale was used as a covariate to determine the extent to which perceived versus available social support differ. Items were reverse scored as necessary so that higher scores indicate increased levels of available and perceived support or satisfaction (See Appendix C).

Spousal Social Support

The spousal social support items were only found in the 1992 interview; therefore, it was used as a covariate for all but the multiple regression analysis. As an additional analysis, to make up for the lack of a reliable spousal support scale to be used across all three waves, a multivariate analysis of variance (MANOVA) was run against married and non-married participants to determine whether their was a significant difference between the two groups on cognition (See Appendix E).

Heart Disease Index

The heart disease index includes questions that were asked at the 1992, 1996, and 2002 interviews. This index was used across all three measures and used for all three analyses. This index includes items related to the presence, severity and symptoms of heart disease (Hargett-Thompson & Guarnaccia, 2004). Items were reverse scored as necessary so that higher scores indicate fewer symptoms of heart disease and better heart health (See Appendix D).

General Social Support. Measures of Social Support include questions that were asked at the 1992, neighbors, friends, family and spouse (Forjaz & Guarnaccia, 2000). Unlike the spousal social support scale, the general social support scale was found across all three waves and showed acceptable alpha internal reliability. As a result, it was used in all three analyses (See Appendix E).

Measures of Cognitive Function

Measures of cognitive function include questions that were taken from the 1992, 1996, and 2002 interviews. Scales and subscales were formed from items that measured different aspects of memory and cognition. Items related to self-reported memory function, immediate and delayed recall, and cognitive activities of daily living are found in 1992, 1996, and 2002 interviews. These items were combined to form sub-scales that screen memory, attention, and

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activities of daily living (See Table 6). Subscales related to orientation, aphasia, and vocabulary were added to the later 1996-2002 analysis as they were present in both of these waves (See Appendix F). In all cases, items were reverse scored, as necessary, so that higher scores indicated better cognitive functioning.

Two Overall Cognitive Functioning scales were created. One scale was used for the 1992-2002 analysis and the second scale, which includes the additional aphasia, orientation and definition subscales, was used for the 1996-2002 analysis See Appendix G). Z-score transformations were done on all scales and subscales so that the measures could be directly compared to one another. The z-score subscales and overall cognition scales were used for all analyses.

Self-Report Memory Subscale

The-Self Report Memory Subscale includes one item, which measures memory. The self-report item was compared individually to the other scales and subscales. The item was treated as its own subscale because of the self-report aspect of the item. These questions ask the participant to rate aspects of his or her memory. These items fall into the domain of memory.

Immediate and Delayed Recall Subscale

The Immediate and Delayed Recall Subscales include summary items found at the end of each interview, which reports the remembered and forgotten items for participants. This measure is an objective rating of attention, short-term memory, and working memory, and falls into the two domains of memory and attention.

Cognitive Independent Activities of Daily Living Subscale

The Cognitive Independent Activities of Daily Living subscales ask participants to report on activities related to reading maps and balancing checkbooks. This was a two-item scale that

fell into the domain of activities of daily living. These items are related to mental activities that are integral in daily life and fall into the domains of memory, attention, and abstract reasoning.

Aphasia Subscale

The Aphasia subscale measures participants' "word-finding" ability, and falls into the domain of language. The participant is given a description of a common item and asked to name the item.

Vocabulary Subscale

The Definitions subscale measures participants' ability to define simple and concrete concepts, and falls into the domain of language and abstract reasoning. This subscale was unable to be reproduced in the appendix because of copyright restrictions that are labeled in the appendix.

DESIGN AND PROCEDURE

Design consisted of three separate main analyses: 1992-2002 attrition analysis, 1992, 1996, 2002 longitudinal analysis, and 1996-2002 longitudinal analysis.

Participants Used in Analyses. Participants for analyses were selected from the 1992, Wave 1, data set. Conditions for the participants included an age range of 51-61 at the 1992 interview. In the two longitudinal analyses, participation in the 1996 and 2002 interviews was also necessary to be selected.

Data Analysis

Descriptive statistics were run on all variables. In addition, a reliability check was run on the scales used for measurement of each construct. This determined the alpha internal reliability for each measure. Alpha internal reliabilities are reported in the appropriate corresponding Tables with Correlation Results.

Three separate data sets were developed from the original data sets. The first was the attrition data set, which includes all three waves and all participants who began in 1992. The second was a longitudinal data set, which includes all three waves (1992, 1996, and 2002) of participants who completed relevant interview items at each wave and includes the overall cognition subscale of self-reported memory, immediate and delayed recall, and cognitive activities of daily living. The third data set data set included the latter two waves (1996 and 2002) of participants who completed relevant interview items at each wave. This latter data set included the additional cognitive subscales of orientation, aphasia, and vocabulary to the already present subscales listed above.

Attrition analysis focuses on possible characteristics of the sample to determine individuals who were likely to drop out or stay in the study across a ten-year period. Using a chi square design, this researcher analyzed gender, marital status, education, and race to determine the characteristics of individuals who were likely to stay in the study across the ten-year time frame. In addition, heart disease was included as it was particularly relevant to the study and participants with increased symptoms are more prone to morbidity than participants who do not report symptoms.

The statistical model used on all the main analyses, was a cross lag panel design. A multiple regression analysis was run on heart disease and general and spousal social support to determine individual and interaction effects as they were predictive of overall cognition within and across time.

Bivariate correlations were run within and across time for all covariates, indices, scales and subscales. Correlations were run both listwise and pairwise on the 1992 within time bivariate correlations and for the three wave across time. This was done specifically for this data set,

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because when items were selected listwise, there were only 8 men and 1443 women, and all of these participants were married. This showed the researcher that in these data sets, the pairwise bivariate correlation is likely to give a more accurate representation of the population that is being examined. Therefore, on the 1996 and 2002 within time and across time analyses, a pairwise bivariate correlation analysis was run.

Correlations

For the 1992 within time bivariate correlation analysis, scales analyzed include the following covariates: self-reported memory, spousal social support, life satisfaction, smoking health behaviors, alcohol health behaviors, exercise health behaviors, body mass, and overall health behaviors scale. Correlate variables include the following: heart disease, general social support, self reported memory, immediate recall, delayed recall, cognitive activities of daily living, and a total cognition scale that includes all cognition items described above for the 1992 wave. The 1992 correlations were run both listwise and pairwise per reasons stated above.

The 1996 within time bivariate correlation analysis included the following correlate variables: heart disease, general social support, self-reported memory, immediate recall, delayed recall, cognitive activities of daily living, aphasia, orientation, definitions, and a total cognition scale that includes all cognition items described above for the 1996 wave. The 1996 within time correlations were run pairwise.

The 2002 within time bivariate correlation analysis included the following correlate variables: heart disease, general social support, self-reported memory, immediate recall, delayed recall, cognitive activities of daily living, aphasia, orientation, definitions, and a total cognition scale that includes all cognition items described above for the 1996 wave. The 1996 within time correlations were run pairwise.

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Across time bivariate correlation analysis was run for two analyses. The initial correlation analysis included 1992, 1996, and 2002 waves of the data set. All variables, except for the covariates were present at each time across all three waves of the data set. Covariate variables that were analyzed include the following: self reported health, spousal social support, life satisfaction, smoking health behaviors, alcohol health behaviors, exercise health behaviors, body mass index, and overall health behaviors. Correlate variables, or variables that exist in each Wave and are measured across time, include the following: heart disease, general social support, self-reported memory, immediate recall, delayed recall, cognitive activities of daily living, and a total cognition scale that includes these correlate variables that exist in all three waves. These correlations were run both listwise and pairwise per reasons stated above.

The second analysis includes the original correlate variables that existed across all three waves plus additional cognition measures that only existed in the 1996 and 2002 waves. This analysis was only run for the 1996 and 2002 waves and all correlate variables exist in both Waves. These variables include the following: general social support, self-reported memory, immediate recall, delayed recall, cognitive activities of daily living, and a total cognition scale that includes the variables that were present across both waves. These correlations were run pairwise.

CHAPTER III

RESULTS

Attrition Analysis Results

Results indicate that educational level was a significant factor of individuals likelihood

to stay in the study. Marital status was also a significant factor on whether individuals were

likely to drop out with listwise correlational analysis revealing that married participants were

more likely to stay throughout the study. In addition, race was also a significant factor that

indicated whether individuals were likely to remain in the study, with results indicating that

Caucasians were most likely to remain in the study over a ten-year period, with other ethnic

groups more likely not to remain in the study for longer periods of time. Gender was also a

significant factor that indicated whether the individual was likely to stay in the study, with

listwise correlational analysis revealing that women were more likely to stay in the study than

men. The presence of heart disease was also a significant factor of whether individuals were

likely to stay in the study (See Table 1).

Multiple Regression Results

Multiple Regression for the 1992,1996,2002 Analysis*

In the 1992 within time analysis, the heart disease index alone and the general social

support scale alone are both significant predictors of the total cognition scale, accounting for

2.1% of the variance each. However, spousal social support alone and the interaction of social

support and heart disease was not significant. In the 1996 and 2002 within time analyses, the

heart disease index alone is a significant predictor of the total cognitions scale, accounting for

.9% of the variance 1992 and 1.1% of the variance in 2002. However, the social support scale

alone and the interaction of social support was not significant.

In the 1992, 1996, 2002 across time analysis, 1992 heart disease index alone and 1992 general social support scale alone are both significant predictors of the 2002 total cognition scale, both accounting for 2.6% of the variance each. However, the interaction of the social support scale and heart disease index was not significant. In addition, the regression analysis of 1992 heart disease index alone and 1992 spousal support alone (p=.009) indicates that the spousal social support index is a significant predictor of the 2002 total cognition scale over time accounting for 1.2% of the variance each.

Multiple Regression for the 1996, 2002 Analysis*

In the 1996 within time analysis, the heart disease index alone and the general social support scale alone are both significant predictors of the total cognition scale, both accounting for 1.4% of the variance each. However, the interaction of the social support scale and heart disease was not significant. In the 2002 within time analysis, the heart disease index alone is a significant predictor of the total cognition scale, accounting for 1.3% of the variance. However, the social support scale alone, and the interaction of the heart disease index and the social support scale were not significant.

In the 1996, 2002 across time analysis, 1996 heart disease index alone and 1996 general social support scale alone are both significant predictors of the 2002 total cognition scale, both accounting for 2.5 % of the variance each. However, the interaction of the social support scale and heart disease index was not significant.

(Please note that all values are significant at p<.0001 unless otherwise indicated).

Univariate and Multivariate Results

Multivariate Analyses were run to see if different gender or marital status was

significantly different on cognition. Results indicate that gender was significantly different on the total cognition scales (p<.0001, F(5)=30.769) . There was not significant difference in whether participants were married. The covariates of life satisfaction (p<.0001, F(5) = 11.82), exercise (p<.0001, F(5) = 10.805), and self-reported health (p<.0001, F(1) = 543), were all significant on cognition.

<div align="center">Correlation Results</div>

Descriptive Statistics for all Pairwise Bivariate Correlational Comparison Analyses are located in Table 2.

1992 Within-Time Listwise Bivariate Correlation Comparison

 The following results are significant listwise bivariate correlations of the 1992 covariate scales with all other 1992 covariates, indices, sub-indices, scales, and subscales. For alpha-internal reliability and a visual display of specific values and how they relate to one another see Table 3.

Significant results that were found for the 1992 Within Time Correlations are as follows. Results indicate that the self-reported health covariate subscale has small to moderate correlations with several other variables within time. Results indicate that the self reported health scale (covariate) display a significant positive correlation at the .01 level with the following variables: spousal social support scale, life satisfaction scale, exercise health behaviors sub-index, body mass health behaviors sub-index subscale, heart disease index, general social support scale, self reported memory scale, immediate recall cognition subscale, delayed recall cognition subscale, cognitive activities of daily living subscale, and total cognition scale.

Results indicate that the spousal social support covariate subscale has small to moderate correlations with several of the variables within time. It has a significant positive correlation at

the .05 level with the following variables**:** exercise health behaviors sub-index. It has a

significant positive correlation at the .01 level with the following variables: life satisfaction

scale, general social support scale, self-reported memory cognition subscale, immediate recall

cognition subscale, delayed recall cognition subscale, cognitive activities of daily living

subscale, and total cognition measure.

Results indicate that the life satisfaction covariate scale has small to moderate

correlations with several of the variables within time. It has a significant positive correlation at

the .01 level with the following variables**:** exercise health behaviors sub-index, body mass health

behaviors sub-index, heart disease index, general social support index, self reported memory

cognition subscale, immediate recall cognition subscale, delayed recall cognition subscale,

cognitive activities of daily living subscale, and total cognition scale.

Results indicate that smoking health behaviors covariate sub-index has small correlations

with some of the variables within time. It has a significant negative correlation at the .05 level

with the following variables: alcohol health behaviors sub-index, and body mass health

behaviors sub-index.

Results indicate that the alcohol use health behaviors covariate sub-index has small

correlations with several of the variables within time. It has a significant negative correlation at

the .05 level with the following variables: general social support scale, self-reported memory

cognition subscale, and delayed recall cognition subscale. It displayed significant negative

correlations at the .01 level with the following variables at the: exercise health behaviors sub-

index, body mass health behaviors sub-index, health behaviors index, and total cognition scale.

Results indicate that the exercises health behavior covariate sub-index has small

correlations with some of the variables within time. It has significant positive correlations at the

.01 level with the following variables: body mass health behaviors sub-index, heart disease index, general social support scale, self-reported memory cognition subscale, immediate recall cognition subscale, delayed recall cognition subscale, cognitive activities of daily living subscale, and total cognition subscale.

Results indicate that the body mass health behavior covariate sub-index (covariate) has small to moderate correlations with several of the variables within time. It has significant positive correlations at the .05 level with the following variables: heart disease index, delayed recall cognition scale, and total cognition subscale. It displayed significant positive correlations at the .01 level with the following variables: self reported memory cognition subscale, immediate recall subscale, and cognitive activities of daily living subscale.

The following results are significant listwise bivariate correlations of the 1992 scales with all other 1992 indices, sub-indices, scales, and subscales. For alpha internal reliability and a visual display of specific values and how they relate to one another see Table which table?.

Results indicate that the heart disease index has small correlations with some of the other variables within time. It has significant positive correlations at the .05 level with the following variables: delayed recall cognition scale. It displayed significant positive correlations at the .01 level with the following variables: cognitive activities of daily living subscale, and total cognition scale.

Results indicate that the general social support scale has small correlations with some of the other variables within time. It has significant positive correlations at the .01 with the following variables: self-reported memory cognition subscale, cognitive activities of daily living subscale, and total cognition scale.

Results indicate that the self-reported memory cognition subscale has small to moderate

correlations with some of the other variables within time. It has a significant positive correlations at the .05 level with the following variables: immediate recall cognition subscale, delayed recall cognition subscale , cognitive activities of daily living subscale, and total cognition scale.

1992 Pairwise Bivariate Correlation Comparison

The following results are significant pairwise bivariate correlations of the 1992 covariate scales with all other 1992 covariates, indices, sub-indices, scales, and subscales. These comparisons include an equal sampling of men and women. For alpha-internal reliability and a visual display of specific values and how they relate to one another see Table 4.

Significant results that were found for the 1992 Within Time Correlations are as follows: Results indicate that the self-reported health covariate scale has small to moderate correlations with several other variables within time. It has a significant negative correlation with the following variable at the .05 level: general social support scale. The self-reported health scale (covariate) displayed significant positive correlations with the following variable at the .01 level: spousal support covariate scale, life satisfaction covariate scale , smoking health behaviors covariate sub-index, exercise health behaviors covariate sub-index, body mass health behaviors covariate sub-index, health behaviors covariate index, heart disease index, general social support, self-reported memory cognition subscale, immediate recall cognition subscale, delayed recall cognition subscale, cognitive activities of daily living, and total cognition scale.

Results indicate that the spousal social support covariate scale has small correlations with other scales within time. It has significant positive correlations with the following variables at the .05 level: heart disease index, and delayed recall cognition subscale. The spousal social support covariate scale displays significant positive correlations with the following variables at the .01 level: life satisfaction covariate scale, exercise health behaviors covariate subscale, self

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reported memory cognition subscale, cognitive activities of daily living, and total cognition scale.

Results indicate that the life satisfaction covariate scale has several small to moderate correlations with several other variables within time. It has significant positive correlations with the following variables at the .05 level: smoking health behaviors covariate sub-index, health behaviors covariate scale. It displays significant positive correlations with the following variables at the .01 level: alcohol health behaviors sub-index, exercise health behaviors sub-index, body mass health behaviors subscale, heart disease index, self-reported memory cognition subscale, immediate recall cognition subscale, delayed recall cognition subscale, cognitive activities of daily living, and total cognition scale.

Results indicate that the smoking health behaviors sub-index has several small correlations and to very high correlation to other variables within time. It has a significant negative correlation at the .05 level with the following variable: general social support scale. It has a significant positive correlation at the .01 level with the following variable: total cognition scale, It has a significant negative correlation at the .01 level with the following variables: alcohol health behaviors sub-index, body mass health behaviors sub-index, and heart disease index. It displays a significant positive correlation at the two-tailed level with the following variables: health behaviors index, and cognitive activities of daily living subscale.

Results indicate that the alcohol health behaviors sub-index has small correlations with other variables within time. It has a significant negative correlation at the .05 level with the following variables: heart disease index. It displayed significant negative correlation at the .01 level with the following variables: health behaviors index, general social support, self-reported memory, and cognitive activities of daily living. It displays a significant positive correlation at

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the .01 level with the following variables: body mass health behavior sub-index.

Results indicate that the exercise health behaviors sub-index has small correlations with some other variables within time. It has a significant positive correlation at the .01 level with the following variables: body mass health behaviors sub-index, heart disease index, general social support scale, self-reported memory cognition subscale, immediate recall cognition subscale, delayed recall cognition subscale, cognitive activities of daily living subscale, and total cognition scale.

Results indicate that body mass index health behaviors sub-index has small to moderate correlations with some of the other variables within time. It has a significant positive correlation at the .05 level with the following variables: self-reported memory cognition subscales and immediate recall cognition subscale. It displays a significant positive correlation at the .01 level with the following variables: heart disease index, delayed recall cognition subscale, and total cognition scale.

The following results are significant pairwise bivariate correlations of the 1992 scales with all other 1992 covariates, indices, sub-indices, scales, and subscales. For alpha internal reliability and a visual display of specific values and how they relate to one another see Table 10.

Heart disease index has small correlations with some of the other variables within time It displays a significant positive correlation at the .05 level with the following variable: delayed recall cognition subscale. It displays a significant positive correlation at the .01 level with the following variables: cognitive activities of daily living, and total cognition scale.

General social support scale has small correlations with some of the other variables within time. It has a significant positive correlation at the .05 level with the following variables: self-reported memory cognition subscale, cognitive activities of daily living subscale, and total

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cognition scale.

Comparison of 1992 Within Time Listwise and Pairwise Correlations

It is important to note that the main differences in the analyses of listwise and pairwise, besides the obvious statistical differences of increase of the number of cases for each variable and the increase in the number of participants, is the addition of men to the data analysis. A brief comparison will be done on the differences of the listwise and pairwise correlations.

The self-reported health covariate subscale has small, moderate, and strong correlations across almost all domains of analysis, or at least one variable of each domain (i.e. immediate recall in cognition), in the listwise comparison. In the pairwise comparison, the correlation strength went down to small and moderate, but still indicated significance in almost all domains of analysis. The spousal social support covariate has small and moderate correlations across the domains if health behaviors and cognition in the listwise comparison. In the pairwise comparison, the strength dropped to small, and the heart disease domain was added and the health behavior domain dropped. The life satisfaction covariate remained the same across listwise and pairwise analysis, with all correlations within the small to moderate range crossing all domains of analysis.

The smoking health covariate sub-index has small correlations for both listwise and pairwise analysis. In the listwise analysis, significance was found in the domains of health behaviors, while in the pairwise analysis, there was an addition of significance in the domains of heart disease and cognition. The alcohol health behaviors covariate sub-index remained the same across both listwise and pairwise comparisons, with both pairwise and listwise comparisons having small correlations across the domains of health and cognition. The exercise health behaviors covariate sub-index and body mass covariate sub-index had small correlations in both

listwise and pairwise comparisons. The listwise correlations for both of these sub-indexes indicated significance in the domains of health and cognition. The pairwise comparison in both sub-indexes maintained these two domains and added heart disease.

The heart disease index and the social support index displayed small levels of significance through the domain of cognition. This relationship was the same in both listwise and pairwise comparisons.

1996 Within Time Pairwise Bivariate Correlation Comparison

The following results are significant pairwise bivariate correlations of the 1996 scales with all other 1996 indices, sub-indices, scales, and subscales. For alpha internal reliability and a visual display of specific values and how they relate to one another see Table 5.

Heart disease has a significant positive correlation at the .01 levels with the following variables within time: self-reported memory cognition subscale, immediate recall cognition subscale, delayed recall cognition subscale, orientation cognition subscale, aphasia cognition subscale, vocabulary cognition subscale, cognitive activities of daily living, and total cognition scale.

The general social support scale has a significant negative correlation at the ,05 level with the following variable within time: self-reported memory. It has a significant negative correlation at the .01 level with the following variables within time: orientation cognition subscale, vocabulary cognition subscale, and total cognition scale.

The self-reported memory cognition subscale has significant positive correlations at the .01 level with the following variables within time: immediate recall cognition subscale, delayed recall cognition subscale, orientation cognition subscale, aphasia cognition subscale, vocabulary cognition subscale, cognitive activities of daily living subscale, and total cognition scale.

The immediate recall cognition subscale has significant positive correlations at the .01 level with the following the following variables within time: delayed recall cognition subscale, orientation cognition subscale, aphasia cognition subscale, vocabulary cognition subscale, and total cognition scale. The delayed recall cognition subscale has significant positive correlations at the .01 level with the following variables within time: orientation cognition subscale, aphasia cognition subscale, vocabulary cognition subscale, and total cognition scale.

The orientation cognition subscale has significant positive correlations at the .01 level with the following variables within time: aphasia cognition subscale, vocabulary cognition subscale, cognitive activities of daily living subscale, and total cognition scale. The aphasia cognition subscale has significant positive correlations at the .01 level with the following variables within time: vocabulary cognition subscale, cognitive activities of daily living, and total cognition scale.

The vocabulary cognition subscale has a significant positive correlation at the .01 level with the following variable within time: cognitive activities of daily living subscale, and total cognition scale.

The cognitive activities of daily living subscale has a significant positive correlation at the .01 level with the following variable within time: total cognition scale.

2002 Within Time Pairwise Bivariate Correlation Comparison

 The following results are significant pairwise bivariate correlations of the 2002 scales with all other 2002 indices, sub-indices, scales, and subscales. For alpha internal reliability and a visual display of specific values and how they relate to one another see Table 6.

Heart disease has a significant positive correlation at the .05 level with the following variable within time: vocabulary cognition subscale. It has a significant positive correlation at

the.01 levels with the following variables within time: self-reported memory cognition subscale, immediate recall cognition subscale, delayed recall cognition subscale, orientation cognition subscale, aphasia cognition subscale, cognitive activities of daily living, and total cognition scale.

The general social support scale has a significant negative correlation at the .05 level with the following variable within time: self-reported memory.

The self-reported memory cognition subscale has significant positive correlations at the .01 level with the following variables within time: immediate recall cognition subscale, delayed recall cognition subscale, orientation cognition subscale, aphasia cognition subscale, vocabulary cognition subscale, cognitive activities of daily living subscale, and total cognition scale.

The immediate recall cognition subscale has significant positive correlations at the .01 level with the following the following variables within time: delayed recall cognition subscale, orientation cognition subscale, aphasia cognition subscale, vocabulary cognition subscale, cognitive activities of daily living subscale, and total cognition scale. The delayed recall cognition subscale has significant positive correlations at the .01 level with the following variables within time: orientation cognition subscale, aphasia cognition subscale, vocabulary cognition subscale, and total cognition scale.

The orientation cognition subscale has significant positive correlations at the .01 level with the following variables within time: aphasia cognition subscale, vocabulary cognition subscale, cognitive activities of daily living subscale, and total cognition scale. The aphasia cognition subscale has significant positive correlations at the .01 level with the following variables within time: vocabulary cognition subscale, cognitive activities of daily living, and total cognition scale. The vocabulary cognition subscale has a significant positive correlation at

the .01 level with the following variable within time: total cognition scale.

The cognitive activities of daily living subscale has a significant positive correlation at the .01 level with the following variable within time: total cognition scale.

1992,1996.2002 Across Time Listwise Bivariate Correlation Comparison

 The following results are significant listwise bivariate across time correlations of the 1992, 1996, 2002 scales with all other covariates, indices, sub-indices, scales, and subscales. These comparisons include 1451 married women and 8 married men. For alpha internal reliability and a visual display of specific values and how they relate to one another see Tables 7 and 8.

The following results are 1992 covariates and the correlations with the 1992,1996, 2002 scales with all other covariates, indices sub-indices, scales and subscales.

The 1992 self-reported health covariate has small to moderate correlations with several of the other variables across time. It has a significant positive correlation at the .01 level with the following variables: 1996 heart disease index, 2002 heart disease index, 1996 self reported memory cognition subscale, 2002 self-reported memory subscale, 1996 immediate recall cognition subscale, 1996 delayed recall subscale, 2002 immediate recall cognition subscale, 2002 delayed recall cognition subscale, 1996 cognitive activities of daily living subscale, 2002 cognitive activities of daily living subscale, 1996 total cognition scale, and 2002 total cognition scale.

The 1992 spousal social support covariate scale has small correlations with some of the other variables across time. It has a significant positive correlation at the .01with the following variables across time: 1996 self-reported memory cognition subscale, 2002 self-reported memory cognition subscale, and 1996 total cognition scale.

The 1992 life satisfaction covariate scale has small correlations with some of the other variables across time. It has a significant positive correlation with the following variables across time: 1996 heart disease index, 2002 heart disease index, 1996 self-reported memory cognition subscale , 2002 self-reported memory cognition subscale, 1996 immediate recall cognition subscale, 1996 delayed recall cognition subscale, 1996 cognitive activities of daily living subscale, 2002 cognitive activities of daily living subscale, and 1996 total cognition scale.

The 1992 alcohol health behaviors covariate sub-index has small correlations with some of the other variables across time. It has a significant positive correlation at the .05 level with the following variables across time: 1996 general social support and 1996 cognitive activities of daily living. It has a significant negative correlation at the .01 level with the following variable across time: 2002 cognitive activities of daily living.

The 1992 exercise health behaviors covariate sub-index has small correlations with several of the other variables across time. It has a significant positive correlation at the .05 level with the following variables over time: 1996 general social support scale, 1996 delayed recall cognition subscale, 2002 delayed recall cognition subscale, 1996 cognitive activities of daily living subscale. It displays a significant positive correlation at the .01 level with the following variables over time: 1996 heart disease index, 2002 heart disease index, 1996 self reported memory cognition subscale, 2002 self-reported memory cognition subscale,1996 immediate recall cognition subscale, 2002 immediate recall cognition subscale, 2002 cognitive activities of daily living, 1996 total cognition scale, and 2002 total cognition scale.

The 1992 body mass health behaviors covariate sub-index has small to moderate correlations with other variables across time. It has a significant positive correlation at the .05 level across time with the following variables: 1996 self-reported memory cognition subscale

and 2002 total cognition subscale. It has a significant positive correlation at the .01 level across time with the following variables: 1996 heart disease index, 2002 heart disease index, 1996 immediate recall cognition subscale, 2002 self-reported memory cognition subscale, 2002 cognitive activities of daily living, and 1996 total cognition scale.

The following results are significant listwise The bivariate correlations of the 1992 scales with all other 1996 and 2002 indices, scales, and subscales across time . For alpha internal reliability and a visual display of specific values and how they relate to one another see Table 8.

The 1992 heart disease index has small to moderate correlations with other variables across time. It has a significant positive correlation at the .05 level with the following variables across time: 1996 self –reported memory cognition subscale and 1996 delayed recall cognition subscale It has a significant negative correlation at the .01 level with the following variable across time: 1996 general social support. It has a significant positive correlation at the .01 level with the following variables across time: 1996 immediate recall cognition subscales , 1996 cognitive activities of daily living subscale , 2002 cognitive activities of daily living subscale, and 1996 total cognition scale.

The 1992 general social support scale has small correlations with several of the other variables across time. It has a significant positive correlation at the .05 level with the following variables across time: 1996 delayed recall cognition subscale, 2002 delayed recall cognition subscale, 1996 total cognition scale. It has a significant positive correlation at the .01 level with the following variable across time: 2002 cognitive activities of daily living subscale.

The 1992 self-reported memory cognition subscale has small correlations with several of the other variables across time. It has a significant positive correlation at the .01 level with the following variables across time: 1996 self-reported memory cognition subscale, 2002 self-

reported memory subscale, 2002 self-reported memory cognition subscale, 1996 immediate recall cognition subscale, 2002 immediate recall cognition subscale, 1996 delayed recall cognition subscale, 2002 delayed recall cognition subscale, 2002 cognitive activities of daily living, 1996 total cognition subscale, 2002 total cognition subscale.

The 1992 immediate recall cognition subscale has small to moderate correlations with several of the variables across time. It has significant positive correlation at the .01 level with the following variables across time: 1996 self-reported memory cognition subscale, 2002 self-reported memory cognition subscale, 1996 immediate recall cognition subscale, 2002 immediate recall cognition subscale, 1996 delayed recall cognition subscale, 2002 delayed recall cognition subscale, 2002 cognitive activities of daily living subscale, 1996 total cognition scale, and 2002 total cognition scale.

The 1992 delayed recall cognition subscale has small to moderate correlations with several of the variables across time. It has a significant positive correlation at the .01 level with the following variables across time:1996 self-reported memory cognition subscale, 2002 self-reported memory cognition subscale,1996 immediate recall cognition subscale, 2002 immediate recall cognition subscale, 1996 delayed recall cognition subscale, 2002 delayed recall cognition subscale, 2002 cognitive activities of daily living subscale, 1996 total cognition scale, and 2002 total cognition scale.

The 1992 cognitive activities of daily living subscale has small to moderate correlations with several of the variables across time. It has a significant positive correlation at the .01 level with the following variables across time: 1996 self-reported memory cognition subscale, 2002 self-reported memory cognition subscale, 1996 immediate recall cognition subscale, 2002 immediate recall cognition, 1996 delayed recall cognition subscale, 2002 delayed recall

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cognition subscale, 1996 cognitive activities of daily living subscale, 2002 cognitive activities of daily living subscale (p<.0001, r=.438), 1996 total cognition scale, and 2002 total cognition scale.

The 1992 total cognition scale has small to moderate correlations with several of the variables across time. It has significant positive correlation at the ,01 level with the following variables across time; 1996 total cognition scale (p<.0001, r=.456) and 2002 cognition scale. 1992,1996,2002 Across Time Pairwise Bivariate Correlation Comparison

The following results are significant pairwise bivariate across time correlations of the 1992, 1996, 2002 scales with all other covariates, indices, sub-indices, scales, and subscales. The following results are 1992 covariates and there correlations with the 1992,1996, 2002 scales with all other covariates, indices sub-indices, scales and subscales. For alpha internal reliability and a visual display of specific values and how they relate to one another see Tables 9 and 10.

The 1992 self-reported health covariate has small to moderate correlations with several of the variables across time. It has a significant negative correlation at the .05 with the following variable across time: 1996 general social support. It has a significant positive correlation at the .01 level with the following variables across time: 1996 heart disease index, 2002 heart disease index, 1996 self-reported memory cognition subscale, 2002 self-reported memory cognition subscale, 1996 immediate recall cognition subscale, 2002 immediate recall cognition subscale, 1996 delayed recall cognition subscale, 2002 delayed recall cognition subscale, 1996 cognitive activities of daily living, 2002 cognitive activities of daily living, 1996 total cognition scale, 2002 total cognition scale.

The 1992 spousal social support covariate has small correlations with several of the variables across time. It has a significant positive correlation at the .05 level with the following

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variables across time: 1996 heart disease index, and 2002 delayed recall cognition subscale. It has a significant positive correlation with the following variables at the .01 level over time: 1996 self-reported memory cognition subscale , 2002 self-reported memory subscale, 2002 immediate recall cognition subscale, 2002 cognitive activities of daily living subscale, and 2002 total cognition scale.

 The 1992 life satisfaction covariate has small to moderate correlations with all but one of the variables across time. It has a significant positive correlation at the .01 level with the following variables across time: 1996 heart disease index, 2002 heart disease index, 1996 general social support scale, 1996 self reported memory cognition subscale, 2002 self-reported memory cognition subscale, 1996 immediate recall cognition subscale, 2002 immediate recall cognition subscale, 1996 delayed recall cognition subscale, 2002 delayed recall cognition subscale, 1996 activities of daily living subscale, 2002 activities of daily living subscale, 1996 total cognition scale, 2002 total cognition scale.

The 1992 smoking health behaviors covariate sub-index has small correlations with two of the variables across time. It has a significant negative correlation at the .05 level with the following variable across time: 1996 general social support scale. It has a significant positive correlation at the .01 level with the following variable across time: 2002 cognitive activities of daily living .

The 1992 alcohol health behaviors covariate sub-index has small correlations with some of the variables across time. It has a significant negative correlation at the .01 level with the following variable across time: total cognitive activities of daily living. It has a significant positive correlation at the .01 level with the following variables across time: 1996 general social support, 1996 cognitive activities of daily living, 2002 immediate recall cognition subscale, 2002

delayed recall cognition subscale.

The 1992 exercise health behaviors covariate subscale has small to moderate correlations with most of the variables across time. It has a significant positive correlation at the .01 level with the following variables across time: 1996 heart disease index, 2002 heart disease index, 1996 self-reported memory cognition subscale, 2002 self-reported memory cognition subscale, 1996 immediate recall cognition subscale, 2002 immediate recall cognition subscale, 1996 delayed recall cognition subscale, 2002 delayed recall cognition subscale, 1996 cognitive activities of daily living, 2002 cognitive activities of daily living, 1996 total cognition scale (p<.0001, r=.122), 2002 total cognition scale (p<.0001, r=.190).

The 1992 body mass health behaviors covariate subscale has small to moderate correlations with all of the variables across time. It has a significant positive correlation at the .01 level with the following variables across time 1996 heart disease index, 2002 heart disease index, 1996 general social support scale, 2002 general social support scale, 1996 self-reported memory scale, 2002 self-reported memory scale, 1996 immediate recall cognition subscale, 2002 immediate recall cognition subscale, 1996 delayed recall cognition subscale, 2002 delayed recall cognition subscale, 1996 cognitive activities of daily living, 2002 cognitive activities of daily living, 1996 total cognition scale, 2002 total cognition scale.

The 1992 health behaviors covariate subscale has small correlations with two of the variables across time. It has a significant negative correlation at the .05 level with the following variable: 1996 general social support. It has a significant positive correlation at the .05 level with the following variable across time: 2002 cognitive activities of daily living.

The following results are significant pairwise bivariate correlations of the 1992 scales with all other 1996 and 2002 indices, scales, and subscales across time. For alpha internal

reliability and a visual display of specific values and how they relate to one another see Table 10.

The 1992 heart disease index has small to moderate correlations with all but one of the cognition variables across time. It has a significant positive correlation at the .05 level with the following variables: 1996 self-reported memory cognition subscale, 2002 self-reported memory cognition subscale, 2002 immediate recall cognition subscale, 1996 delayed recall cognition subscale, 2002 delayed recall cognition subscale, 1996 cognitive activities of daily living, 2002 cognitive activities of daily living, 1996 total cognition scale, 2002 total cognition scale.

The 1992 general social support scale has small correlations with several of the cognition variables across time. It has a significant positive correlation at the .01 level with the following variables across time: 1996 self-reported memory cognition subscale, 2002 self-reported memory cognition subscale, 2002 immediate recall cognition subscale, 2002 delayed recall cognition subscale, 2002 cognitive activities of daily living subscale, 1996 total cognition scale, 2002 total cognition scale.

The 1992 self-reported memory cognition subscale has a small to moderate correlations with all of the other cognition variables across time. It has a significant positive correlation at the .01 level with the following variables across time: 1996 self-reported memory, 2002 self-reported memory, 1996 immediate recall cognition subscale, 2002 immediate recall cognition subscale, 1996 delayed recall cognition subscale, 2002 delayed recall cognition subscale, 2002 delayed recall cognition subscale, 1996 cognitive activities of daily living, 2002 cognitive activities of daily living, 1996 total cognition scale, 2002 total cognition scale.

The 1992 immediate recall cognition subscale has small, moderate, and strong correlations with all of the other cognition variables across time. It has a significant positive correlation at the .01 level with the following variables: 1996 immediate recall cognition

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subscale, 2002 immediate recall cognition subscale, 1996 delayed recall cognition subscale, 2002 delayed recall cognition subscale, 2002 delayed recall cognition subscale, 1996 cognitive activities of daily living, 2002 cognitive activities of daily living, 1996 total cognition scale, 2002 total cognition scale.

The 1992 delayed recall cognition subscale has small, moderate, and strong correlations with all of the other cognition variables across time. It has a significant positive correlation at the .01 level with the following variables: 1996 delayed recall cognition subscale, 2002 delayed recall cognition subscale, 2002 delayed recall cognition subscale, 1996 cognitive activities of daily living, 2002 cognitive activities of daily living, 1996 total cognition scale, 2002 total cognition scale.

The 1992 cognitive activities of daily living subscale has moderate to strong positive correlations at the .01 level with the following variables across time: 1996 cognitive activities of daily living, 2002 cognitive activities of daily living, 1996 total cognition scale, 2002 total cognition scale.

The 1992 total cognition has moderate correlations with the 1996 and 2002 total cognition subscales.

Comparison of 1992, 1996, 2002 Across Time Listwise and Pairwise Correlations

It is important to note that the main differences in the analyses of listwise and pairwise, besides the obvious statistical differences of increase of the number of cases for each variable is the addition of men to the data analysis. A brief comparison will be done on the differences of the listwise and pairwise correlations.

The self-reported health covariate subscale has small, moderate, and correlations with the 1996 and 2002 heart disease domains and the 1996 and 2002 cognition domains in the listwise

comparison. In the pairwise comparison, the correlation strength remained constant, kept the previous domains as in the listwise comparison, but also added the social support domain. The spousal social support covariate has small correlations across the domains if 1996 and 2002 heart disease and 1992 and 2002 cognition in the listwise comparison. In the pairwise comparison, the correlation strength remained the same and the 1996 heart disease domain was added. The life satisfaction covariate has small correlations for 1992 and 2002 heart disease and 1992-2002 cognitive domains in the listwise comparison. The correlations maintain these relationships, but increase to small/moderate in the pairwise comparisons.

The smoking health covariate sub-index does not indicate significance in the listwise comparison. In the pairwise analysis, small correlational significance was found in the domains of health behaviors. In addition, in the pairwise analysis, there was a small relationship between smoking and the 1996 general social support and 2002 cognition domains. The alcohol health behaviors covariate sub-index remained the same across both listwise and pairwise comparisons, with both pairwise and listwise comparisons having small correlations across the domains of social support and cognition.

The exercise health behaviors covariate sub-index has a small to moderate correlational strength for 1996 and 2002 social support, and 1996 and 2002 cognition in the listwise comparison. In the pairwise comparison, some moderate strength correlations and the 1996 heart disease domain was added. The body mass covariate sub-index has small to moderate correlations in 1996 heart disease and 1996 and 2002 cognition domains in the listwise comparison. In the pairwise comparison, the 2002 heart disease and 1996 and 2002 cognition domains were added.

The heart disease index remained stable in both listwise and pairwise comparisons with

small to moderate correlations in the 1996 social support and cognition domains as well as the 2002 cognition domains.

1996, 2002 Across Time Pairwise Bivariate Correlation Comparison

The following results are significant pairwise bivariate across time correlations of the 1996, 2002 scales with all other indices, sub-indices, scales, and subscales. alpha internal reliability and a visual display of specific values and how they relate to one another see Table 11.

The 1996 heart disease index has small to moderate correlations with all of the cognition variables in 2002. It has a significant positive correlation at the .01 level with the following variables: 2002 self-reported memory cognition subscale, 2002 immediate recall cognition subscale, 2002 delayed recall cognition subscale, 2002 orientation subscale, 2002 aphasia subscale, 2002 vocabulary subscale, 2002 cognitive activities of daily living, and the 2002 total cognition scale.

The 1996 general social support scale has small negative correlations with several of the cognition variables across time. It has a significant negative correlation at the .05 level with the following variables across time: 2002 self-reported memory cognition subscale It has a significant negative correlation at the .01 level with the following variables across time: 2002 immediate recall cognition subscale, 2002 orientation cognition subscale, 2002 cognitive activities of daily living subscale, and the 2002 total cognition scale.

The 1996 self-reported memory cognition subscale has a small to moderate correlations with all but one of the other cognition variables across time. It has a significant positive correlation at the .01 level with the following variables across time: 2002 self-reported memory, 2002 immediate recall cognition subscale, 2002 delayed recall cognition subscale, 2002 orientation cognition subscale, 2002 aphasia subscale, 2002 cognitive activities of daily living,

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2002 total cognition scale.

The 1996 immediate recall cognition subscale has small, moderate, and strong correlations with all of the other cognition variables across time. It has a significant positive correlation at the .01 level with the following variables: 2002 self-reported memory subscale, 2002 immediate recall cognition subscale, 2002 delayed recall cognition subscale, 2002 orientation cognition subscale, 2002 aphasia cognition subscale, 2002 vocabulary subscale, 2002 cognitive activities of daily living, and 2002 total cognition scale.

The 1996 delayed recall cognition subscale has small, moderate, and strong correlations with all of the other cognition variables across time. It has a significant positive correlation at the .01 level with the following variables: 2002 self-reported memory cognition subscale, 2002 immediate recall cognition subscale, 2002 delayed recall cognition subscale, 2002 orientation cognition subscale, 2002 aphasia cognition subscale, 2002 vocabulary subscale, 2002 cognitive activities of daily living, and 2002 total cognition scale.

The 1996 orientation cognition subscale has a small to moderate correlations with all but one of the other cognition variables across time. It has a significant positive correlation at the .01 level with the following variables across time: 2002 self-reported memory, 2002 immediate recall cognition subscale, 2002 delayed recall cognition subscale, 2002 orientation cognition subscale, 2002 aphasia subscale, 2002 cognitive activities of daily living, 2002 total cognition scale.

The 1996 aphasia cognition subscale has small to moderate correlations with all of the other cognition variables across time. It has a significant positive correlation at the .01 level with the following variables: 2002 self-reported memory cognition subscale, 2002 immediate recall cognition subscale, 2002 delayed recall cognition subscale, 2002 orientation cognition subscale,

2002 aphasia cognition subscale, 2002 vocabulary subscale, 2002 cognitive activities of daily living, and 2002 total cognition scale.

The 1996 vocabulary cognition subscale has small, moderate, and strong correlations with all of the other cognition variables across time. It has a significant positive correlation at the .01 level with the following variables: 2002 self-reported memory cognition subscale, 2002 immediate recall cognition subscale, 2002 delayed recall cognition subscale, 2002 orientation cognition subscale, 2002 aphasia cognition subscale, 2002 vocabulary subscale, 2002 cognitive activities of daily living, and 2002 total cognition scale.

The 1996 cognitive activities of daily living subscale has small, moderate, and strong correlations with all of the other cognition variables across time. It has a significant positive correlation at the .01 level with the following variables: 2002 self-reported memory cognition subscale, 2002 immediate recall cognition subscale, 2002 delayed recall cognition subscale, 2002 orientation cognition subscale, 2002 aphasia cognition subscale, 2002 vocabulary subscale, 2002 cognitive activities of daily living, and 2002 total cognition scale.

CHAPTER IV

DISCUSSION

Methodological Issues

Because of the limitations and benefits of using a pre-existing data set for research, the

researcher felt that it was necessary to include a section on methodological issues, negative and

positive, faced in this research project. It is assumed that these are likely common issues and

limitations experienced by all researchers who choose to engage in this type of research and

analysis involving large pre-existing public data sets.

In this analysis, compiling scales was difficult, as items were limited and pre-existing

measures would often change across waves. A scale that seemed to have good face validity could

often have poor internal reliability. In addition, when scales were found across waves, there were

times when there was missing data, which made it impossible to be used. A case example is that

of the spousal social support scale. When the researcher was able to find items that seemed face

valid, across waves, not only was alpha-internal reliability poor, but also there was a significant

portion of missing data. The fact of the missing data was verified per HRS reports. As a result,

this scale could only be addressed in one Wave.

In addition to reliability issues, several measures are shorter than desired. This seems to

be a result of availability of items. As a result, some of the cognition subscales are shorter than

would otherwise be desired in a clinical setting. The aphasia sub-scale, for example, is only a

two-item scale. In a clinical setting, it can really only be used as a basic screen. This dampens the

sensitivity of the measure. As a result of alpha internal reliability issues and brevity of some of

the scales, it is likely that mild significance on one of these measures indicates significant

problems in this particular area of functioning. Therefore, the intensity or presence of deficits is

likely not to always be reflected.

Another issue is the idea that these screens could miss more subtle problems that could show up in earlier stages of an illness, which is the area on which this research was focused. However, the researcher was fortunate in that the measure that has been shown in research to detect mild cognitive impairment (MCI) was Immediate and Delayed recall, and in this research study, this measure was administered fully and accurately, and displays excellent alpha internal reliability.

An additional issue to address is the large sample size of participants. Although this has many advantages, there is a concern that power could be artificially inflated, and that results could show significance simply as a result of the large number of participants. Because of this reason the researcher looked at variance accounted for in the regression analysis. This analysis showed that variance accounted for was minimal, and although it was statistically significant, it is probable that the significance level and variance accounted for are both a result of the large number of participants in the study. Because of this likelihood, it is important to remember that, in this case, statistical significance does not necessarily equate to clinical significance. Therefore, it is important to proceed with caution when generalizing these findings to a clinical population.

There are many advantages to this type of research. In this case, despite other issues, participants were able to be followed over a ten-year period. In looking at this type of progression, specifically that of heart disease to cognition, it would be relatively impossible to follow participants over a ten-year period without a great deal of expense and time. Although some of the scales had lower internal reliability than this researcher might otherwise have liked, there is enough reliability to determine that heart disease in middle age has a significant predictive relationship on cognition in later life.

Although the large number of participants can be a problem, it is also a great benefit. In this case, the sample was large and representative enough that these results can, with reasonable confidence, be said to represent a very large and diverse U.S. population. However, in this type or research, a type of self-selection occurs among participants. As shown through attrition analysis and listwise bivariate correlations, individuals who choose to remain in the study over a ten-year period, have very defined characteristics. This is also likely with individuals who initially choose to participate in the study. Although this may blur the representation of the sample, the type of individuals who choose to participate and remain in the study is informative in itself.

Attrition Analysis

As stated above, attrition analysis was run on factors of interest and include education level, marital status, race/ethnicity, and gender. Heart disease was also analyzed because of its relevance to the study and the increased likelihood of morbidity related to the illness.

Results indicate that there is significant difference in individuals who were married than individuals who were not married in attrition rates, with individuals who were married more likely to remain in the study over the ten-year duration. In addition, there was a significant difference in the racial/ethnic background of individuals who were likely to remain in the study, with Caucasians more likely to initially participate and remain in the study over time. This is likely a reflection of socioeconomic status and education level (where there is also a significant difference), as well as access and attitudes to health related services. It is also likely that many of the minorities, because of lack of access to health related services were more likely to drop out of the study for poorer health and higher morbidity rates. It is also likely that because of cultural attitudes about health-related topics and with whom this information should be shared, that many

minorities were reluctant to participate and remain in the study.

As a fortunate turn of events, listwise correlation analysis revealed that individuals who were most likely to answer every question of the interview across all three waves were married women. This indicates that married women are likely the healthiest cohort, and likely, the individual in the household who feels responsible for the health needs of the family.

Some factors were far to numerous to be assessed. It is assumed that individuals who reported higher prevalence and severity of terminal and chronic illness were also less likely to survive the ten-year interview process than more healthy participants.

<h3 style="text-align:center">Cardiovascular Disease as a Predictor of Later Cognition</h3>

Results do support the hypothesis that cardiovascular disease is a significant predictor of cognition in later life. The 1992-2002 analysis indicates that symptoms of cardiovascular disease in 1992 significantly predict cognitive functioning ten years later. This is also the case in the 1996-2002 analysis, which has the additional subscales, with symptoms of cardiovascular disease significantly predicting cognitive functioning four years later in 2002. In the later analysis, the variance accounted for is smaller. It is likely that this is a result of the smaller alpha internal reliability of this cognition scale. Both variances accounted for, although significant, are smaller than expected. This is likely the result of smaller alpha internal reliability in both cognition scales. It is likely if this were stronger that the variable would account for a larger amount of the variance. This, of course, is one of the pitfalls in using pre-existing data as mentioned above in the methodological issues section.

This finding suggests that cardiovascular disease does have a relationship with cognition in later life. These findings suggest that cardiovascular disease may indeed play a part in the onset of MCI and then Alzheimer's disease (AD) down the line. This further suggests that most

age-related dementias may indeed have a vascular component that is contributing to their development.

Clinical interventions for these findings should focus on the interventions that decrease cardiovascular disease over time. Research has supported health behavior interventions that can have significant effects on this illness such as diet and exercise. Also stress management and peripheral biofeedback techniques can have a significant effect on hypertension. A focus on these type of interventions can help the client to protect future health and cognition.

<center>Social Support as a Predictor of Later Cognition</center>

Results also support the hypothesis that general social support is a significant predictor of cognition in later life. The 1992-2002 analysis indicates that general social support significantly predicts cognitive functioning ten years later. This is also the case in the 1996-2002 analysis, which has the additional subscales, with general social support significantly predicting cognitive functioning four years later in 2002. In the later analysis, as above, the variance accounted for is smaller. Again, this is likely the result of the smaller alpha internal reliability of this cognition scale. Both variances accounted for, although significant, are again, smaller than expected. Again, this is likely contributed to the smaller reliability in both scales.

Results support the hypothesis that spousal social support is a significant predictor of cognition in later life. The 1992-2002 analysis indicates that spousal social support significantly predicts cognitive functioning ten years later. This spousal social support accounts for a smaller amount of the variance than the general social support scale. When spousal support was analyzed further to see if there was a significant difference in cognition between married and non-married participants over time, no difference was found.

These findings suggest that general social support actually may have a stronger protective

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factor on cognition than spousal social support. This may be due to the nature of the spousal relationship. If the spousal relationship is a stressful one, it may cause more difficulty than help.

The hypothesis that social support would moderate the relationship of heart disease and cognition is not supported in this analysis. That is, neither general nor spousal social support acts on heart disease to affect cognition in later life. These findings are particularly interesting because social support does predict cognition in later life, Therefore the question is how does it do this.

With heart disease, there seems to be a vascular component that seems to be affecting cognition. However, it is uncertain where and how social support acts on cognitive functioning. It would seem that if it acted on health behaviors, we would see its action on cardiovascular disease. Therefore, this is likely not the case. It appears that social support has an independent mechanism that acts on cognition.

At this point, any ideas on the mechanism by which it has an effect, is, of course, purely speculation. It is possible that some of the chemicals released by the brain when engaging in positive social relationships forms a type of protective mechanism for the brain and the resulting cognitive functioning. Degeneration of the hippocampus is generally the first physiopathological symptom of MCI as well as a physiopathological symptom of prolonged stress exposure. It is not impossible to think that social support mediates this hippocampal damage by mediation of stress.

It is also possible that it acts on psychological disorders that might have an effect on cognitive functioning. For example someone who has more social support may feel less depressed or anxious and, as a result, may not be as distracted, and feel more alert when taking tests related to cognitive function or perceive his or her memory as better.

Clinical interventions for this finding can focus on increasing the individuals social

support network, or to help the client focus on increasing the quality of existing relationships by teaching interpersonal or communication skills.

Gender Differences

Results do support a gender difference on cognition across time. Although it is uncertain what this difference is, looking at the prevalence of heart disease among men versus women, it is likely that men have decreased cognition. In addition, when looking at covariate correlations, most differences between listwise and pairwise correlations are the addition of men and this addition seems to bring with it significant relationships of heart disease with other variables.

In addition, women tend to have more non-marital friendships with other women that likely act as a stress buffer. Their relational styles also tend to focus on talking with these friends about their problems, where many men of this cohort tend to keep their problems to themselves. It is important that clinicians are aware of these gender differences and model interventions accordingly.

Covariates and Their Relationship Within and Across Time

Self-reported Health

Results indicate that self reported health displays a significant mild relationship with spousal social support, life satisfaction, exercise health behaviors, body mass health behaviors, heart disease, general social support, self reported memory, immediate recall, delayed recall, cognitive activities of daily living, and total cognition scale in the listwise comparison. This relationship is strengthened in the pairwise comparison. Therefore, in this section, results can be generalized to both men and women of this cohort.

These above mentioned relationships do not just exist within time. Self –reported health sustains moderate relationships with heart disease and cognition for both 1996 and 1992 waves.

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These relationships can also be generalized to both men and women.

There are two possible implications for these results. The first possibility is that the individual's perception of spousal social support affects his or her perception of health. As stated in the literature review of this paper, research consistently reports that individuals who perceive more social support from spouses report increased health. Even in the presence of chronic illness, individuals who perceive more spousal social support indicate better health than their counterparts who do not have the same quality of social support.

The second implication is individuals who perceive their health as better, or have better health, may perceive increased social support from their spouses. This may be a result of the limitations that poorer health places on these individuals, or how they feel on a daily basis. Limitations may include both physical and psychological aspects of health. Individuals who have physical fatigue or limitations may find it difficult to engage in previously enjoyed activities with partners. In addition, they may find a decrease of enjoyment or frequency of sexual interaction. Psychological limitations may include depression, guilt, or anxiety related to a diagnosis. This may cause an overall decrease of enjoyment in the relationship.

When developing health related interventions for this population, it is important to include the individual's perception of the relationship and consider the possible contribution that it is making to health perceptions as well as look at chronic health problems and how they may be affecting the marriage. Clinical implications for couples' therapy may need to consider the health status of both partners and recommend individual interventions accordingly so that this is not a confounding factor in the therapy. Clinicians may also consider educating both partners about possible obstacles a chronic health problem can bring to the relationship. Offering options as far as alternate activities and ideas about increasing intimacy may also be helpful for the

relationship.

Likewise, there is a significant positive relationship between self-reported health and general social support. The more social support that the individual has the more likely he or she is to perceive overall health as better. In addition, the individual is more likely to have people to help with daily activities of daily living. The individual also has additional emotional support apart from his or her spouse. For women, and many men, this social support can be particularly meaningful if he or she is allowed to talk about her problems related to her health.

In this situation, however, the second possibility is slightly varied. This relationship could also mean that the better an individual's health, the more general social support he or she perceives. If an individual is in better health he or she is more likely to go out more and form more relationships as well as spend more time cultivating existing relationships. In addition, if the illness is serious enough, many individuals of existing support networks may not understand what the individual is going through or may feel embarrassed to talk about the illness. In this situation, the individual may feel stigmatized or isolated.

Clinical interventions can involve focusing on nurturing pre-existing relationships by making schedules that involve spending time with friends. It can also be useful to encourage support groups so that the client can form new social support networks with others who have a similar illness. This can give the individual a support network to utilize that understand the changes and adjustments that may be required as a result of the illness.

Self-reported health has a moderate to strong relationship with life satisfaction indicating that reports of increased health have a significant relationship with reports of increased life satisfaction in areas related to environment, family, and friends. There are two possible implications for this relationship. The first implication is that this relationship may indicate that

individuals who report better health perceive more satisfaction in most areas of their day-to-day lives. The second implication is that the relationship may indicate that individuals who are more satisfied with their lives perceive that they have better health even in the presence of chronic illness.

Both of these possibilities have significant clinical implications. For health related interventions, it seems that the more satisfied an individual is with other aspects of his or her life, the more optimistic the individual is likely to be about current health. For individuals with chronic illness, having increased life satisfaction is likely to improve adherence to medical regiments as well as give incentive to engage in more positive health behaviors such as improved diet and increased exercise.

It is also possible that individuals who have improved health report more satisfaction with other aspects of their lives. Here again, the idea of limited physical and psychological resources may come into play. Chronic illness can have negative psychological effects on individuals, including increased anxiety and depression. This can "color" other aspects of life. This can also be more salient depending how long the individual has been diagnosed with the illness. Many individuals, early in diagnosis, display a reactive depression, and this may often resolve the farther away the individual gets from actual diagnosis. When a clinician is assessing a patient for psychological symptoms, it is important to not whether the individual has been recently diagnosed with a chronic illness.

In addition, there are many illnesses where psychological symptoms are a physiological side effect or predisposing symptom to the illness. It is important to note that many individuals with neurological disorders or certain cancers will report symptoms of depression or concurrent to diagnosis. In this situation, the illness may be causing a psychophysiological change that could

be influencing the individual's perception of the world.

Self-reported health has a mild to moderate relationship with exercise health behaviors, with reports of increased health as exercise health behaviors increase. Individuals who get daily exercise likely have more energy and feel better, whether or not they have medical problems. A clinical intervention of increased aerobic activity, when using a team approach with the client's physician generally, is a benefit to the client.

Body mass has a mild to moderate correlation with self-reported health. This relationship indicates that individuals who report a lower body mass index also report increased self-reported health. This may also be a function of how the individual feels physically. It is likely that individuals who have a higher body mass index have decreased energy levels, which in turn, means that they do not participate in as much activity as individuals who have a lower body mass index.

It also may be a function of self-image. If the individual equates less weight as attractive, this could affect the way that the individual views himself or herself. This finding is likely particularly salient to women, who often are concerned with their appearance. In a clinical setting, it requires a delicate therapeutic strategy to promote healthy weight management, without hurting the client's self-image. This can be helped by promoting diet and exercise, focusing on how the individual feels and the health behaviors in which he or she engages rather than on a specific weight loss or body mass.

Self-reported health displays a significant positive correlation with heart disease. Within time, this relationship seems to be straight forward in that an individual who reports symptoms of heart disease also reports decreased self-reported health. This relationship is likely stronger, the more severe or uncontrolled the symptoms. This, of course, is variable, among individuals,

depending on other health problems or possible aspects in their life. For example, as we noted above, if the individual reports a great deal of life satisfaction, or support from his or her spouse, the individual might report better health than his or her counterpart with the same illness.

This relationship seems to increase in strength across time, with individuals who report less health early on reporting more symptoms of heart disease four years later and then again ten years later.

Self-Reported health displays a significant correlations with self-reported memory. Again, there are two possible relationships in this scenario. The first possible scenario is that the individual who perceives poor health may feel that this is affecting his or her memory. This is a very valid possibility, as research has shown, individuals who have health problems, often have difficulty with attention and cognition. This could be for several reasons, depending on the illness. For many disorders, the brain has actually undergone a biological, pathological change, and this is affecting memory. It is also the case, that when the disorder is not neurodegenerative, that the individual could be missing sleep, feeling poor, or not getting adequate nutrition or exercise, all of which affect attention and memory. In addition, many people may be feeling depression as a reaction to the diagnosis or the resulting life changes. This too can have an affect on perceived memory.

The other possibility is that the individual who perceives a decline in memory is feeling that this is a sign that his or her health is declining. This may or may not be due to objective memory deficits. As stated in the initial paragraphs, there is a normal decline in memory as individual ages. Many individuals become hypervigilant at the slightest change in cognitive ability as they age. This is especially true if they had a loved one who died or is currently suffering from a dementing illness.

Self reported health has a significant positive relationship with immediate and delayed recall. This relationship is more objective in that the individual cannot be entirely sure what is being measured, even if it is somewhat obvious. In addition, this test was given later in the interview than the question about health. This indicates that the relationship is likely to be that higher self-reported health indicates higher performance on these two measures.

This could be for a number of reasons. One reason is that the illness has caused a decline in memory. This could be from purely neurodegenerative causes or from secondary causes of a non-neurodegenerative illness. These causes could include such things as the individual who does not feel well may have a more difficult time paying attention, and therefore not perform as well on the measures as another individual. There is also the above-mentioned possibility that the individual is having some psychological issues that are causing him or her to be distracted. In a clinical setting, it is important to take all of these factors into account when assessing the individual.

Self-reported health has a significant relationship with reported cognitive activities of daily living. This relationship, again, has two possible implications. One possibility is that individuals with poor health have a more difficult time with cognitive activities of daily living, such as balancing a checkbook, or using a computer. The other possibility is that individuals who have a difficult time doing these tasks see it as a reflection upon their current health status.

It is possible that individuals who do not feel well have a more difficult time keeping up with daily tasks. This is likely a reflection of decreased energy or concentration due to the illness or psychological reactions to the illness. In a clinical setting, the clinician can recommend possible strategies to help the individual keep up with these tasks, such as keeping a day planner, or if the deficit is sever, hiring an accountant or financial consultant.

There is also the possibility that because the individual is having a difficult time managing what used to be common tasks that he or she perceives this mismanagement as a reflection of his or her current health or cognitive ability. In a clinical setting, it would be necessary to identify the reasons for the mismanagement and treat accordingly. If the clinician felt that there was a possible organic cause, he or she could refer the patient for medical or neuropsychological testing. However, if the mismanagement seemed to be related to a mood or lifestyle factor, then the clinician could intervene at that particular level.

Self-reported health also has a moderate relationship with total cognition. This relationship has two possible implications. One implication is that poor health, depending on the illness, by its draining of resources, increase in fatigue, reactive psychological responses, or even direct damage to neural tissue may be causing a direct affect on cognition. The other possibility is that as an individual perceives his or her cognition as worse, he or she is also perceiving her health as worse. Interventions may be similar to those mentioned in above paragraphs. In a clinical setting, it would be necessary to identify the possible cause of decreased cognition and treat the patient accordingly. Self-reported health maintains and strengthens its relationship with these variables of cognition four and ten years later.

Spousal Social Support

Results indicate that spousal social support has a mild relationship with life satisfaction, self reported memory, cognitive activities of daily living, and total cognition scale in the listwise comparison. This relationship is strengthened in the pairwise comparison and heart disease is added as a strong relationship, while health behaviors are not as strong. Therefore, with these exceptions, results can be generalized to both men and women of this cohort. It also has minor relationships over time with self-reported memory and total cognition.

Spousal social support has a mild relationship with life satisfaction. This relationship is not surprising considering that both variables seem to be related to other variables including self-reported health. There are two possible implications to this relationship. One possibility is that the better relationship an individual is with his or her spouse, the more satisfaction that he or she perceives with the rest of his or her life. The other possible relationship is that the more satisfied an individual is with his or her life, the better perception that he or she will have of the spousal relationship. It is likely that both of these relationships exist, dependant on the individual.

In a clinical setting, it would be important to identify which direction that the relationship exists and treat the client accordingly. If the client is reporting unhappiness as a result of the spousal relationship, couple's counseling might be a viable option. On the other hand if he or she is reporting unhappiness in their relationship because of stress in other areas of life it is important to target those areas or help the client to develop coping skills or stress management to help with these areas.

Spousal social support has a mild relationship with heart disease, There are two possible implications for this relationship. One possibility is that individuals that have higher levels of social support have less symptoms of heart disease. The other possibility is that symptoms of heart disease affect the individual's perception of social support. Because of the research literature, it is likely that the relationship that exists is that of the action of social support on heart disease. As mentioned above, it is likely that spousal support acts on health behaviors, which in turn acts on the illness. This relationship, can of course, work both ways, either having a positive or negative effect on health behaviors. In clinical intervention, it is very important to not which way the relationship exists. When helping an individual change health behaviors, it is important to be aware of the environment from where the individual is coming. If the spouse has and is

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supporting negative health behaviors, interventions may be more helpful targeted at working

with both client and spouse.

Spousal support has a mild relationship with several of the subscales of cognition within

and across time. This relationship across time seems to indicate that the relationship exists as

spousal support acting on cognition because of the direction over time. Again, this seems to be

the logical relationship considering the research literature. Considering the results of this paper,

it is questionable how this support is acting on cognition as there seems to be no significant

moderating effect of spousal social support on the relationship of heart disease and cognition.

However, regardless of the mechanism and size, the relationship seems to exist. Therefore

clinically speaking it is necessary to consider this when working with clients who are having

cognitive problems. It may be necessary to look at the nature of the spousal relationship to

determine improvements and interventions that could take place.

Life Satisfaction

Results indicate that life satisfaction has mild to moderate relationships with health

behaviors, including alcohol, exercise, and body mass. In addition, it has mild to moderate

relationships with heart disease and cognitions. This relationship is strengthened in the pairwise

comparison. Therefore, in this section, results can be generalized to both men and women of this

cohort. It also has minor relationships over time with heart disease and cognition.

Life satisfaction has significant relationships with health behaviors. There are two

possibilities as far as the directionality of this relationship. The first possibility is that as health

behaviors become more positive and beneficial, that the more people report increased life

satisfaction. This, of course, is a wonderful chance for intervention. In a clinical setting,

increasing positive health behaviors can be a relatively straightforward intervention.

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The other possibility, that as people report increased life satisfaction, they engage in more positive health behaviors. Considering the research cited above, this does not seem an unlikely result. If individuals are unhappy with their lives, or are experiencing some depression related to situational factors, it would not be uncommon for them to engage in more negative health behaviors such as increased alcohol and nicotine use, decreased exercise, and eating an unbalanced diet. If this is the relationship, the clinical intervention may take a different turn. In this case, the clinician could take a CBT approach and focus on the perception of different aspects of the client's life, or help the client to consider changing different aspects of his or her life.

Life satisfaction has a significant relationship with heart disease and this relationship is maintained over time. Again, in this scenario, there are two possibilities in this relationship. One possibility is that as life satisfaction increases, individuals report fewer symptoms of heart disease. In this scenario, life satisfaction could act on health behaviors, which in turn could act on heart disease, minimizing symptoms. In this case, as above, clinical intervention could focus on perceptions of different aspects of the client's life.

The second possibility is that as symptoms of heart disease increase, reports of life satisfaction decrease. This, of course, would mean that the illness is interfering with the client's quality of life. Clinical intervention in this area could focus on minimizing symptoms as well as making adjustments in health behaviors and working with any reactive psychological symptoms that the individual may have.

Life satisfaction also has a significant relationship with cognition and maintains this relationship over time. One possible relationship is that as life satisfaction increases, cognition increases. This indicates that there is something in life satisfaction that affects cognition. It may

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be likely that individuals who report low levels of satisfaction have psychological symptoms such as depression or anxiety that are interfering with their cognition. It is also possible that individuals who report lower levels of life satisfaction do not have the social support that acts as a buffer against cognitive decline. Clinical intervention could focus on treatment of psychological symptoms or helping the client build up his or her social support system.

Health Behaviors. Different health behaviors display different relationships with variables. Smoking has a negative correlation with other health behaviors indicating the individual who have increased smoking engage in fewer health behaviors. In addition, when the correlations were analyzed using pairwise comparisons, mild to strong negative correlations were found with general social support, cognition, and social support. In addition, these relationships were maintained over time. This indicates that individuals who smoke not only do not engage in negative health behaviors, they tend to have less social support and are at increased risk for heart disease and decreased cognition over time. These possibilities, are of course supported by the literature and seem to support a clinical intervention of smoking cessation.

Alcohol use has a negative relationship with cognition in both listwise and pairwise comparisons and over time has a negative correlation with general social support and cognition, specifically self-reported memory and cognitive activities of daily living, and a positive correlation with body mass. With general social support, this makes logical since. It indicates that the more an individual uses alcohol, the less social support that he or she has. This relationship has two possible implications. The first implication is that the individual who has less social support is likely to drink. It is also possible that the individual who have increased drinking have a difficult time maintaining relationships in their existing social support systems.

Over time, self-reported memory and activities that involve balancing a checkbook are

likely to suffer as the individual is likely to neglect basic tasks or is unable to think or work

clearly because of the damage that increased alcohol use over time can have on the brain.

Exercise has small correlations with other variables within time for both men and women

on body mass, heart disease, general social support, and scales of cognition. This relationship is

likely the case because of the researched affects that exercise has on health, specifically on heart

disease and other vascular diseases that may affect cognition over time. Clinical intervention

could focus on interventions that increase client activity levels.

Body mass displays significant small to moderate relationships within time for both

analyses and over time with heart disease and cognition. This is logical considering the reported

effects that obesity has on health, specifically heart disease, and the resulting affects that heart

disease may have on cognition over time. Again, clinical intervention can focus on and increase

in activity and more balanced nutrition.

<center>Conclusions and Implications for Future Research</center>

As reported above two hypotheses of the study were reported. The initial hypothesis that

cardiovascular disease predicts cognition later in life was supported, and the hypothesis that

general and spousal social support predict cognition later in life was supported. However, social

support did not moderate or mediate the relationship between cardiovascular disease and

cognition. Therefore, it is suggested that social support has a mechanism all its own that acts as a

buffer for cognitive functioning. In the supported hypotheses, variance accounted for was

minimal. As discussed in the above paragraphs, this is likely due to weaker alpha internal

reliability than the researcher would have liked.

Future research should focus on creating data sets with set reliable scales across time. It

would also be optimal if many of these scales were full clinical measures so that deficits could be

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accurately reflected. In this research, many of the measures are more viewed as screens because of the number of questions. Because of this In addition, using covariate variables across measure might also give a more accurate picture of the variables that were affecting cognition.

The focus of vascular illness and cognition is quickly falling into two camps. One that believes that VaD and AD are two separate dementias, and that neither one has any similar causal factor, the other camp is the one that believes that cardiovascular factors not only account for a significant amount of the variance, but are one of the main causal factors of both dementing processes. These are both difficult hypotheses to test as experimental control with this type of population is difficult to say the lease. Therefore, we must rely on these type of longitudinal designs to help us understand these illnesses. With improved measures, and more testing, it is likely that understanding these age-related illnesses is only around the corner.

Table 1

Attrition Analysis

Attrition Analysis			No	Yes	Total	Chi-Square
Dropped Out		Actual #	7017	2626	9645	
Education Level						
Less than High School	Yes	Actual #	1867	1295	3162	$p < .0001$
		Expected	2023.2	757.2	2780.4	$df =34$
High School Graduate	Yes	Actual #	2532	909	3441	102.8
		Expected	2504.9	937.4	3442,3	
Some College	Yes	Actual #	1303	446	1749	
		Expected	1272.4	476.2	1748.6	
College Graduate or Higher	Yes	Actual #	1315	356	1671	
		Expected	1216.4	455.2	1671,6	
Marital Status						
Married or Partner	Yes	Actual #	5420	1911	7333	$p.$ $< .0001$
		Expected	5335	1996.5	7333	$df = 2$
Not Married	Yes	Actual #	1587	715	2312	21.569
		Expected	1682	629.5	2312	
Race						
Caucasian	Yes	Actual #	5135	1756	6893	$p<.0001$
		Expected	5014	1877.2	6893	$df = 10$
African American	Yes	Actual #	1110	542	1652	47.593
		Expected	1201.8	449.9	1652	
Native American /Eskimo	Yes	Actual#	56	25	81	
		Expected	58.9	22.1	81	
Asian/Pacific Islander	Yes	Actual #	73	40	113	
		Expected	82.2	30.8	113	

(table continues)

Table 1 *(continued).*

Attrition Analysis			No	Yes	Total	Chi-Square
Hispanic	Yes	Actual #	629	256	885	See above
		Expected	643.8	241	885	
Gender						
Male	Yes	Actual #	3178	1327	4506	*p*<.0001
		Expected	3278.2	1226.8	4506	*df* = 2
Female	Yes	Actual #	3839	1299	5139	21.112
		Expected	3738.8	1399.2	5139	
Heart Disease						
Presence of Heart Disease		Actual #	7017	2626	9645	*p<.0001*
		Expected	7017	2626	9645	*df* =96
						198.78

Table 2

1992 ,1996, 2002/1996,2002 Pairwise Bivariate Correlation Comparison. Descriptives

Scale/Subscale		Men		Women	
	N	Married	Single	Married	Single
Self-Reported Health	6675	2595	403	2572	1105
Spousal Social Support	4933	2399	NA	2543	NA
Life Satisfaction	6428	2399	397	2534	1098
Smoking	6675	2595	403	2572	1105
Alcohol	6675	2595	403	2572	1105
Exercise	6675	2595	403	2572	1105
BMI	6675	2595	403	2572	1105
Health Behaviors	6675	2595	403	2572	1105
92 Heart Disease	6675	2595	403	2572	1105
96 Heart Disease	6672	2592	403	2572	1105
02 Heart Disease	6660	2593	400	2564	1103
92 General Social Support	4090	10	403	2572	1105
96 General Social Support	5289	2092	401	1694	1102
02 General Social Support	6673	2593	403	2572	1105
92 Self-Report Memory	6408	2390	394	2530	1094
96 Self-Report Memory	6343	2322	392	2533	1096
02 Self-Reported Memory	6143	2211	372	2482	1076
92 Immediate Recall	6298	2343	383	2497	1075
96 Immediate Recall	6321	2313	385	2530	1093
02 Immediate Recall	6104	2198	366	2469	1071
92 Delayed Recall	5967	2234	352	2379	1002

(*table continues*)

Table 2 (*continued*).

Scale/Subscale		Men		Women	
	N	Married	Single	Married	Single
02 Delayed Recall	6095	2193	364	2467	1071
92 Cognitive ADLs	6545	2570	393	2522	1060
96 Cognitive ADLs	6667	2594	400	2572	1101
02 Cognitive ADLs	6674	2594	403	2572	1105
96 Orientation	6348	2325	392	2534	1097
02 Orientation	3425	1214	199	1385	627
96 Aphasia	6343	2322	391	2533	1097
02 Aphasia	3425	1214	199	1385	627
96 Vocabulary	6450	2334	392	2532	1092
02 Vocabulary	3354	1198	189	1360	607
92 Total Cognition	6663	NA	NA	NA	NA
96 Total Cognition	6674	2595	402	2572	1105
02 Total Cognition	6675	2595	403	2572	1105
96 Total Mod Cog	6675	2595	403	2572	1105
02 Total Mod Cog	6675	2595	403	2572	1105

NA= Not applicable or number too large to be calculated.

Table 3

Listwise Within-Time Bivariate Correlations of the 1992 scales

ALPA	SELF-R HEALT	SPOU S SS	LIFE SATISF	SMOKE	ALCOH OL	EXER CI	BODY MASS	HEALTH BEH	HEARD IS	GEN S S	SELF-RE ME	IMM RE	DEL REC	COG ADL	TOT COG
Self-Re Health	1 Item														
Spouse SocSup	.131	(.44)													
Life Satisf.	.539	.298	(.76)												
Smoke	NS	NS	NS	Index											
Alcohol	-.082	NS	NS	NS	Index										
Exercis	.263	.057*	.224	NS	-.089	Index									
Body Mass	.158	NS	.086	-.079	-.085	.157	Index								
Health Behav.	NS	NS	NS	.997	-.092	NS	NS	Index							

(table continues)

Table 3 *(continued).*

ALPA	SELF-R HEALT	SPOU S SS	LIFE SATISF	SMOKE	ALCOH OL	EXER CI	BODY MASS	HEALTH BEH	HEARD IS	GEN S S	SELF-RE ME	IMM RE	DEL REC	COG ADL	TOT COG
Heart Disease	.247	NS	,100	NS	NS	.118	NS	NS	Index						
General SS	.115	NS	.129	NS	-.059*	.119	NS	NS	NS	(.38)					
Self-Re Memor	.335	.133	.260	NS	-.066*	.126	.065*	NS	NS	.067*	1 Item				
Imm Recall	.179	NS	.084	NS	NS	.081	.064*	NS	NS	NS	.174	(.86)			
Del Recall	.179	.078	.088	NS	-.067*	.068	.073	NS	.054*	NS	.156	.760	(.86)		
Cog ADL	.311	.084	.169	NS	NS	.119	.054*	NS	.072	.055*	,279	.197	.218	(.40)	
Total Cog	.365	.126	.228	NS	-.080	.143	.093	NS	.074	.062*	.585	.775	.776	.616	(.79)

* These results are significant at .05; all other results are significant at .01.

Values on main diagonal in parentheses are Cronbach's Alpha internal consistency reliabilities.

Table 4

Pairwise Within-Time Bivariate Correlations of the 1992 Scales

ALPA	SELF HEAL	SPOUS SS	LIFE SATISF	SMOKE	ALCOHO L	EXERCI	BODY MASS	HEALTH BEHAV	HEART DIS	GEN S S	SELF-RE MEMORY	IMM RE	DEL REC	COG ADL	TOTL COG
Self Report	1 Item		.												
Spous SocSu	.128.	(.44)	.												
Life Satisf.	.522	.263	(.76)												
Smoke	R=054	NS	.024	Index											
Alcoh	NS	NS	.053	-.145	Index										
Exerci	.277	.043	.201	NS	NS	Index									
Body Mass	.123	NS	.050	-.062	.057	.137	Index								

(table continues)

Table 4 *(continued).*

ALPA	SELF HEAL	SPOUSS SS	LIFE SATISF	SMOKE	ALCOHOL	EXERCI	BODY MASS	HEALTH BEHAV	HEART DIS	GEN SS	SELF-RE MEMORY	IMM RE	DEL REC	COG ADL	TOTL COG
Health Behav	.059	NS	NS	.996	.068	NS		Index							
Heart Diseas	.205	.035	.138	-.044	.031	.191	.191	-.038*	Index						
Gener SS	.074	NS	.100	NS	.062	044	.044	-.028	.034*	(.38)					
Self-Re M	,407	.092	.258	.026	-.034	.159	.048	.026*	.086	.059	1 Item				
Immed Recall	.109	NS	.078	NS	NS	.132	,085	NS	.075	.049	.186	(.86)			
Delay Recall	.114	.033	.071	NS	NS	.097	.081	NS	.083	.046	..155	.771	(.86)		
Cog ADL	.166	.052	.201	.067	-.044	.145	.026*	.065	.104	.045	.301	.198	.192	(.40)	
Total Cog	409	.069	.229	.030	XX	.195	.083	.032	.110	.073	.609	.776	.775	.651	(.79)

- These results are significant at .05; all other results are significant at .05.

Table 5

Pairwise Within-Time Bivariate Correlations of the 1996 Scales

ALPA	HEART DISEASE	GEN SS	SELF-REPO	IMM RECALL	DEL REC	ORIEN.	APHASIA	VOCAB	COG ADL	TOTA COG
Heart Disease	Index									
General SS	NS	(.38)								
Self-Report M.	.077	-.036	1 Item							
Immed. Recall	.040	NS	.080	(.86)						
Delay Recall	.054	NS	.083	.866	(.86)					
Orientation	.051	-.042	.151	.098	.110	(.08)				
Aphasi	.057	NS	.095	.091	.087	.245	(.07)			
Vocabulary	.103	-.070	.152	.125	.128	.286	.302	(.32)		
Cog ADL	.069	NS	.152	.049	.040	.134	.133	.106	(.40)	
Total Cog	.104	-.035*	.458	.622	.628	.542	.524	.566	.529	(.78)

* These results are significant at .05; all other results are significant at .01.

Values on main diagonal in parentheses are Cronbach's Alpha internal consistency reliabilities.

Table 6

Pairwise Within-Time Bivariate Correlations of the 2002 Scales

ALPHA	HEART DISEASE	GEN SS	SELF-RE MEMORY	IMM RECALL	DEL RECALL	ORIEN.	APHASI	VOCAB	COG ADL	TOTAL COG
Heart Disease	Index									
Gen SS	NS	(.38)								
Self-Re Memor	.098	-.026*	1 Item							
Immed. Recall	.076	NS	.241	(.86)						
Delay Recall	.091	NS	.243	.720	(.86)					
Orientation	.046	NS	.168	.267	.250	(.08)				
Aphasia	.052	NS	.079	.187	.197	.251	(.07)			
Vocabulary	.039*	NS	NS	.074	.063	.037	.058	(.32)		
Cog ADL	.099	NS	.222	.193	.180	.258	.174	NS	(.40)	
Total Cog	.113	NS	.564	.740	.735	.588	.520	.346	.656	(.78)

* These results are significant at .05; all other results are significant at .01.

Values on main diagonal in parentheses are Cronbach's Alpha internal consistency reliabilities.

Table 7

Across Time Listwise Bivariate Correlations for 1992-2002 Covariate Across Time Analysis

ALPA	HEART 96	GEN S 96	SELF RE 96	IMM RE 96	DEL RE 96	COGA 96	TOTC 96	HEART 02	GEN S 02	SELF-RE 02	IMMRE0 2	DELRE 02	COGA 02	TOTC 02
Self-Rep H	.245	.115	.268	.208	.200	.119	.308	.209	XX	.296	.087	.113	.365	.096
Spousal SS	NS	.073	.091	NS	NS	NS	.089	NS	NS	.087	NS	NS	.126	NS
Life Satisfact	.135	.129	.183	.101	.119	.089	.191	.107	NS	.180	NS	NS	.228	NS
Smoke	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Alcohol	NS	-.059	NS	NS	NS	.058*	NS	NS	NS	NS	NS	NS	-.080	NS
Exercis	.105	.119	.074	.097	.062*	.060*	.113	.108	NS	.101	.082	.062*	.143	.085.
Body Mass	.219	NS	.067*	.074	NS	NS	.079	.228	NS	.082	NS	NS	.093	.052*
Health B	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

- These results are significant at .05; all other results are significant at .01 .

Table 8

Across Time Listwise Bivariate Correlations for 1992-2002 Across Time Analysis

ALPA	HEART 96	GEN S 96	SELF RE 96	IMM RE 96	DEL RE 96	COGA 96	TOTC 96	HEART 02	GEN S 02	SELF-RE 02	IMMRE 02	DELRE 02	COGA 02	TOTC 02
Heart D 92	.708	-.072	.065*	.080	.063	.078	.111	.501	NS	NS	NS	NS	.111	.096
Gen S 92	NS	-.087	NS	NS	.063*	NS	.060*	NS	NS	.070	NS	NS	NS	NS
Self-Re 92	NS	NS	.402	.201	.199	NS	.308	.068	NS	.361	.104	.130.	.253	.585
Immed. Recal 92	NS	-.057	.176	.353	.331	NS	.341	NS	NS	.178	.241	.260	.176	.775
Delay Recal 92	.054*	-.042	.179	.317	.319	NS	.315	.064*	NS	.174	.214	.241	.206	.776
Cog A 92	.072	NS	.178	.178	.222	.223	,616	.082	NS	.210	.140	.150	.438	.616
Tot Cog 92	.092	.062*	.131	.642	.502	.056*	.515	.091	NS	.336	.254	.831	.108	.265

* These results are significant at .05; all other results are significant at .01.

Table 9

Across Time Pairwise Bivariate Correlations for 1992-2002 Covariate Across Time Analysis

ALPA	HEART 96	GEN S 96	SELF RE M 96	IMM RE 96	DEL RE 96	COGA 96	TOTC 96	HEART 02	GEN S 02	SELF-RM 02	IMMRE02	DELRE 02	COGA 02	TOTC 02
Self-Rep H	.262	-.032*	.318	.109	.114	.166	.262	.205	NS	.321	.217	.235	.287	.334
Spousal SS	.034	NS	.068	NS	NS	NS	NS	NS	NS	.068	.038	.037*	.052	.040
Life Satisf	.144	.085	.207	.053	.060	.096	.150	.086	NS	.193	.098	.117	.164	.168
Smoke	NS	-.030*	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	.056	NS
Alcohol	NS	.043	NS	NS	NS	.032	NS	NS	NS	NS	.041	.048	-.060	.040
Exercis	.110	NS	.114	.055	.062	.080	.122	.101	NS	.126	.123	.123	.130	.190
Body Mass	.209	NS	.047	.052	.055	NS	.052	.197	NS	.077	.065	.068	.050	.078
Health Behav.	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	.054	NS

* These results are significant at .05; all other results are significant at .01.

Table 10

Across Time Pairwise Bivariate Correlations for 1992-2002 Across Time Analysis

ALPA	HEART 96	GEN S 96	SELF RE 96	IMM RE 96	DEL RE 96	COGA 96	TOTC 96	HEART 02	GEN S 02	SELF-RE 02	IMMRE 02	DELRE 02	COGA 02	TOTC 02
Heart D 92	.695	-.036*	.318	NS	.034	.066	.071	.484	NS	.086	.094	.110	.104	NS
Gen S 92	.055	-.059	.060	NS	NS	NS	.049	.034*	NS	.059	.055	.079	.047	NS
Self-Re 92	.067	-.048	.422	.069	.081	.130	.516	.054	NS	.374	.212	.201	.256	.320
Immed. Rec 92	.063	-.034*	.187	.157	.178	.102	.791	.051	NS	.209	.366	.371	.181	.381
Delay Re 92	.088	NS	.180	.141	.184	.075	.790	.075	NS	.188	.328	.350	.174	.351
Cog A 92	.075	NS	.152	.094	.086	.165	.564	.066	NS	.195	.199	.189	.435	.329
Tot Cog 92	.103	-.039	.354	.164	.187	.185	.515	.082	NS	.609	.776	.775	.651	.265

* These results are significant at .05; all other results are significant at .01.

Table 11

Across Time Pairwise Correlations for 1996, 2002 Across Time Analysis

	HEART DIS 96	GEN96	SELF-RE 96	IM RECALL 96	DELRE96	ORIEN96	APHAS96	VOCAB96	COG96	TOC96
Heart Disease 02	.627	NS	.075	NS	.031*	.049	.056	.094	-.070	.113
General SS 02	NS	NS	-.036*	NS	NS	NS	NS	NS	NS	NS
Self-Rep M02	.091	-.035*	.499	.091	.099	.171	.098	.177	.144	.564
Immed Recall 02	.096	-.041	.185	.155	.176	.193	.172	.245	.103	.740
Delay Recall 02	.110	NS	.178	.154	.202	.177	.175	.258	.110	.735
Orientation 02	.078	-.051	.147	.059	.072	.336	.209	.255	.118	.588
Aphasia 02	.062	NS	.085	.079	.080	.206	.489	.301	.055	.520
Vocabulary 02	.045	NS	NS	.037*	.037.*	NS	.057	.100	NS	.346
Cog ADL 02	.115	NS	.191	.080	.071	.222	.212	.244	.231	.656
Total Cog 02	.132	NS	.317	.163	.180	.311	.293	.342	.249	.473

* These results are significant at .05; all other results are significant at .01.

Self-Reported Health

Spousal Social Support

Life Satisfaction

Health Behaviors

Cardiovascular Disease
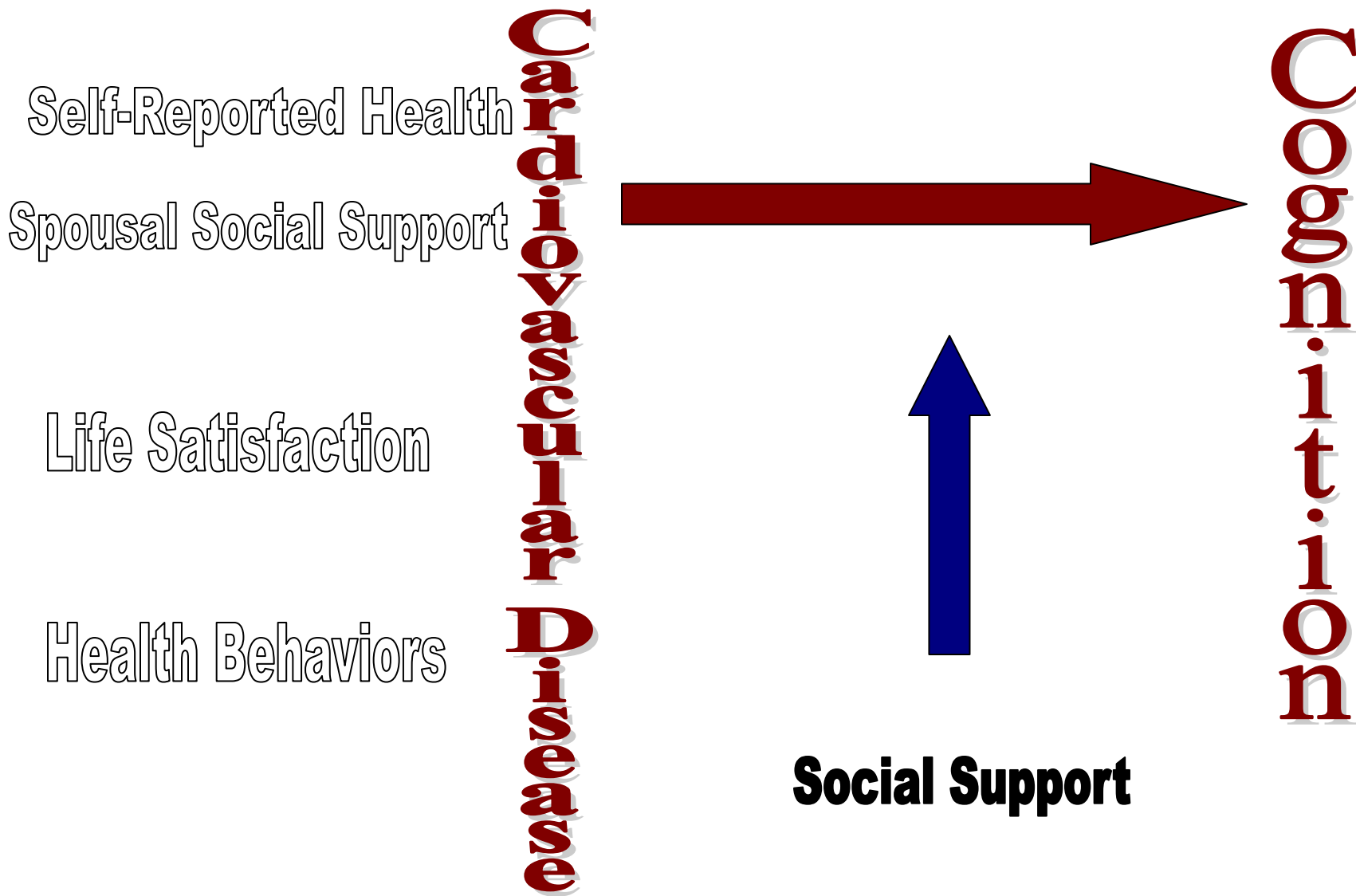
Cognition

Social Support

Figure 1. Model of the research design.

APPENDIX A

SELF-REPORTED HEALTH COVARIATE ITEM

Self- Reported Health

1.   Next I have some questions about your health. Would you say your health is excellent,

very good, good, fair, or poor?

APPENDIX B

HEALTH BEHAVIORS INDEX

Smoking

1. Have you ever smoked cigarettes?

2. Do you smoke cigarettes now?

3. About how many cigarettes or packs do you usually smoke in a day now?

4. About how many years ago did you stop smoking?

5. When you were smoking the most, about how many cigarettes or packs did you usually

   smoke in a day?

Alcohol

6. Do you ever drink any alcoholic beverages such as beer, wine, or liquor?

7. In general, do you have less than one drink a day, one to two drinks a day, three or four

   drinks a day, or five or more drinks a day?

8. Have you ever felt you should cut down on your drinking?

9. Have people ever annoyed you by criticizing your drinking?

10. Have you ever felt bad or guilty about drinking?

11. Have you ever taken a drink first thing in the morning to steady your nerves or get rid of

    your hangover?

Exercise

12. How often do you participate in light physical activity such as walking, dancing,

    gardening, golfing, or bowling?

13. How often do you participate in vigorous physical exercise or sports such as aerobics,

running, swimming, or bicycling?

14. How often do you do heavy housework like scrubbing floors or washing windows?

Body Mass Index

15. About how much do you weigh?

16. About how tall are you?—FEET

17. About how tall are you?—INCHES

APPENDIX C

LIFE SATISFACTION SCALE

Are you very satisfied, somewhat satisfied, about evenly satisfied and dissatisfied. Somewhat dissatisfied, are very dissatisfied with..

1 ..your house or apartment?

2. ..with the neighborhood where you live?

3. ..with your own health and physical condition?

4. ..with your financial satiation?

5. ..with your friendships?

6. ..with the way you handle problems that come up in your life?

7. .. with your life as a whole?

APPENDIX D

HEART DISEASE INDEX

1. Have you ever had surgery on your heart?

2. Has a doctor ever told you that you have high blood pressure or hypertension? R

3. Are you taking medication for your blood pressure? R

4. Do you have high blood pressure of hypertension at the present time? R

5. (Has a doctor ever told you that you had) a heart attack, coronary heart disease, angina, congestive heart failure, or other heart problems? R

6. Did you have a heart attack or myocardial infarction? R

7. Do you currently have any angina or chest pains due to your heart? R

8. Are you taking or carrying any medications because of your chest pain? R

9. Has a doctor ever told you that you have congestive heart failure? R

10. Are you taking any medications for this? R

11. During the last 12 months, have you seen a doctor for any of your heart problems? R

12. Have you ever had a special test or treatment of your heart where tubes were inserted into your veins or arteries (cardiac catheterization, coronary angiogram or angioplasty)? R

APPENDIX E

SOCIAL SUPPORT SCALES

Spousal Social Support Scales

1. How would you describe your time that you spend with your spouse?

   Very enjoyable, somewhat enjoyable, not enjoyable at all?

2. How much of your free time do you and your spouse spend together?

   All of our free time, Some of our free time, Little of our time, No time

General Support Scale

1. Do you have any relatives in this [your]neighborhood?

2. Do you have any good friends living in this [your] neighborhood?

3. How often do you get together with any of these [your] neighbors just for a chat or social

   visit?

APPENDIX F

OVERALL MEASURE OF COGNITIVE FUNCTION

Self-Report Memory

1.How would you rate your ability to think quickly [memory] at the present time? Would you say it is excellent, very good, good, fair, or poor? R

2.Compared with 2 years ago, how would you rate your ability to think quickly [memory]? Would you say it is much better now, somewhat better now, about the same, somewhat worse, or much worse now than it was then? R

Recall (Immediate and Delayed)

3.Next, I'll read a set of 20 words and ask you to recall as many as you can. We have purposely made the list long so that it will be difficult for anyone to recall all the words -- most people recall just a few. Please listen carefully as I read the set of words. When I finish, I will ask you to recall aloud as many of the words as you can, in any order. Do you have any questions? Now please tell me the words you can recall.

a. lake	h. door	q. coffee
b. car	j. mountain	r. steam
c. army	k. pipe	s. cat
d. forest	m. plant	t. winter
e. ticket	n. bird	u. ship
f. city	o. corn	v. dust
g. cabin	p. iron	

.

5. A little while ago, I read you a list of words and you repeated the ones you could remember.

Please tell me any of the words that you remember now.

a. lake	h. door	q. coffee
b. car	j. mountain	r. steam
c. army	k. pipe	s. cat
d. forest	m. plant	t. winter
e. ticket	n. bird	u. ship
f. city	o. corn	v. dust
g. cabin	p. iron	

Self Report of Cognitive Activities in Daily Living

How difficult is it for you to...

4....use a map to figure out how to get around in a strange place? R in 1992

5....use a calculator to help balance your checkbook? R in 1992

APPENDIX G

ADDITIONAL SUBSCALES FOR 1998-2002 ANALYSIS

Orientation

The date is:

6. What is the Day? R

7. What is the Year? R

8. What is the Day of the Week? R

9. Who is the President of the United States? R

10. Who is the Vice President of the United States? R

Aphasia

11. Now I'm going to ask you for the names of some people and things, what do people usually

do to cut paper? R

12. What do you call the kind of prickly plant that grows in the desert? R

Definitions

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