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MARRIAGE AND MEMORY IN OLDER ADULTS

By

RENU KUMAR

Under the Direction of Dr. Elisabeth Burgess

ABSTRACT

Some loss in memory is considered a part of normal aging; however, there is a considerable heterogeneity in cognitive aging among older adults. Studies show that living arrangements, social interaction, social relationships and size of social network are among the predictors of memory decline for older adults. Moreover, marriage has been associated with physiological health as well as psychological and social well-being. This study has examined the relationship between the marital status and memory performance in older adults. It was hypothesized that (1) being married will be positively related to memory of older adults; (2) participants with larger supportive social network will perform better on memory tests; and (3) that quality of married life will be positively related to memory for married older adults. Results from this study did not support the hypotheses when age was controlled suggesting no relationship between marital status and memory performance.

INDEX WORDS: Marriage, Older adults, Social interaction, Memory, Social network

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by

RENU KUMAR

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of

Master of Arts

in the College of Arts and Sciences

Georgia State University

2012

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2012

MARRIAGE AND MEMORY IN OLDER ADULTS

by

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Georgia State University

August 2012

# DEDICATION

I like to dedicate my thesis to my mother and my in-laws. My mother who was very independent all her life had a very sharp decline in her memory after the age of 65 where as my both in-laws stayed mentally sharp till their death (90s). This contrast in memory gave me the inspiration to conduct this study.

# ACKNOWLEDGEMENTS

I would like to thank my thesis committee members, Dr. Ann Pearman and Dr. Candace Kemp for their assistance and keen interest in my project. Their continued support and timely feedback with suggestions were of great help in the completion of my thesis. Most importantly, I would like to thank my thesis committee chair, Dr. Elisabeth O. Burgess for her enthusiasm and guidance. She took me under her wings when she was not even familiar with my work. Her continued support and encouragement helped me finish my project within the time frame. I would also like to thank other faculty members of Gerontology Institute for providing me different perspectives and challenging me on issues related with gerontology.

I am indebted to all those participants who have given their time and energy for being the participants in my study without any monetary rewards. Without their altruistic efforts, I could not have conducted this study. So many participants made indelible impression on me that I feel I had learned more through these direct interactions with them than through class lectures.

It has been an honor for me to be a graduate student in the Gerontology Institute. For past two years, the Gerontology Institute has been my second family where the fellow students and my lab mates have provided me unconditional support. They have been my confidants and great friends for which I have been extremely grateful.

Finally, I would like to thank my children, Atul, Anjli, and Asha for encouraging me to do my best and my father for believing in me. I would especially thank my husband for his unconditional support, love, and encouragement. His unwavering love and confidence in me to succeed in life means the world to me and that made this journey very possible for me.

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# 1 BACKGROUND INFORMATION

Human beings are social animals. To satisfy their needs and desires, humans have created a social structure consisting of different people playing different roles (Berkman, 1995). Family is one of these social structures where each person has a different significance in that social configuration. Social relationships start the day a child is born and these relationships develop across the life span as the person grows. Social relationships provide people important social, psychological, and behavioral function throughout their lives (Uchino, Cacioppo, & Kiecolt-Glaser, 1996). Engaging in social relationships also promotes complex interpersonal exchanges in which people share their joy and sorrow with someone who has the capability to understand them (Holtzman, Rebok, Saczynski, Kkouzis, Doyle, & Eaton, 2004). Complex interpersonal exchanges, in turn, may stimulate their cognitive faculties (Bassuk, Glass, & Berkman, 1999).

As people age, they often go through physiological as well as cognitive changes. Some loss in physical ability and in memory is considered a part of normal aging (Pansky, Goldsmith, & Koriat, 2009). These age-related losses generally should not hinder quality of life and their independence. However, there is considerable heterogeneity in physical and cognitive aging among older adults as some people who are in their seventies and eighties are more physically intact and cognitively sharp than other people who may suffer impairment in their physical and cognitive abilities (Seeman, McEwen, Singer, Albert, & Rowe, 1997). So, the question that is explored in this study is: *why do some people show more age-related decline in memory during later life than others* or *more specifically, how do social relations specially having a spouse, help people to keep their memory sharp?* The focus of this study was to see if marital interaction is related to older adults' memory.

Existing literature shows that physical activities, stress levels, living arrangement (such as living alone or living with a spouse), social interaction, social relationships and size of social network are among the predictors of memory decline for older adults (Bassuk, et al., 1999; Ertel, Glymour, & Berkman, 2008; Holtzman et al., 2004; Holt-Lunstad, Birmingham, & Jones, 2008; Luanaigh & Lawlor, 2008; Lupien, deLeon, de Santi, Convit, Tarshish, Nair, Thakur, McEwen, Hauger, & Meaney, 1998; Seeman et al., 1997; Seeman, Lusignolo, Albert, & Berkman, 2001; Uchino et al., 1996). A tremendous effort has been made by many researchers to examine the factors that may have an impact on the memory of older adults including social relationships and social support in general. However, little of the research addresses this topic in a marriage context. In fact, only few studies have focused on social relationships and social support that comes from being married and how these factors interact with memory. This type of research is needed especially when the life expectancy has been increasing steadily and people are living into their eighties and nineties (Gupta, Rowe, & Pillai, 2009; Kuster & Merkle, 2004) and to stay in the community independently, these older adults need to stay cognitively sharp. Once people retire from their jobs, they lose their professional circle. By this time, children have left the nest to build their own lives. Although majority of parents do stay in regular contact with their adult children, it is not the same level of face-to-face contact as co-residence (Hong & Duff, 1997). All these factors may contribute to social disengagement for older adults as they are not in contact with relatives and friends in person which could be a risk for their cognitive decline (Bassuk et al., 1999). As married older adults reach their seventies or eighties, the spouse may be the only relation that provides them with social interaction on consistent basis.

In the current study, relationship between the marital status and cognitive ability in older adults is being explored. It was hypothesized that married older adults will perform better on

memory tests than unmarried older adults. More specifically, the purpose of this study was to examine the potential benefits of built-in factors of marriage such as social interaction, social embeddedness, quality of life, supportive network, as well as social isolation and their relationship with memory performance in older adults. The result of this study will serve as valuable baseline information, and contribute to the body of literature providing some answers about how the married life can be beneficial to older adults to keep their memory intact.

# 2 LITERATURE REVIEW

## 2.1 *Introduction*

Marriage has been associated with physiological health as well as psychological and social well-being because married people perform better in memory than non-married people (Gove, Style, & Huges, 1990; Kim & McKenry, 2002; Pansky et al., 2009; Lee, Seccombe, & Shehan, 1991; Marks, 1997; Shapiro & Keyes, 2008; Xinhua, 1997). Marital status binds people together in an intimate relationship. It also provides a feeling of belonging and purpose to people which can help buffer the stress of life. Marriage is not only beneficial to young people, this benefit continues with age because it tends to reduce the level of isolation (Xinhua, 1997). On the other hand, individuals with better mental health may be more likely to get married and stay in marriage (Gove et al. 1990). The association between marital status and individual psychological well-being can be explained with two perspectives: 1) role theory and 2) social selection perspective. The role theory which Kim & McKenry (2002) call protective perspective states that there is something about the spousal relationship that produces positive well-being and as a result married people feel emotional support (Gove et al, 1990) and mutual obligations for each other which appear to reduce the depressive symptoms (Kim & McKenry, 2002). However, according to the selective perspective, personal attributes such as personal disposition and idiosyncrasies, past experiences, physical and psychological health, and socioeconomic status appear to have an impact on people to be involved in social relationship (Kim & McKenry, 2002). Studies show that more people with high levels of well-being tend to get into marital relationships and stay in relationships than people with low levels of well-being (Gove et al, 1990). The aim of this research was to understand if: 1) marital relationship makes a difference in the memory of an older adult, and 2) being married makes a positive difference in the memory

of an older adult. Thus, in this literature review, the protective perspective to explain the relationship between marital interaction and memory in older adults is explored.

Although there had been extensive studies examining the benefits of marriage and/or social interaction on mental and physical health in older adults, there were fewer studies that had examined these benefits in terms of cognition. Here, in this study, the research on the benefits of social and specifically marital interaction on the memory of older adults was reviewed.

### *2.2 Marital Status and Memory*

Marriage often plays a central role in many adults' lives. According to the US Census Bureau, about fifty-six percent of people ages 65 and older were married in 2009 (US Census Bureau News, 2010). In 2009, seventy-two percent of men and forty-two percent of women were married. There were four times more widows than widowers (41% to 13%), thirteen percent of women were divorced or separated as opposed to eleven percent men and a total of eight percent of men and women were single (never married) (US Department of Health and Human Services, 2010).

According to Current Population Survey (CPS) from US Census Bureau (2010), about sixty percent of people with high school diploma were married and forty percent of people were non-married whereas sixty-seven percent of people with master's degree were married and thirty-three percent people were non-married. For the professional degree or doctorate degree, this discrepancy between married and non-married was even wider. For example, seventy-six percent of people with professional or doctorate degree were married as opposed to twenty-four percent were non-married (Current Population Survey: Version 3.0. 2010).

According to CPS from US Census Bureau, thirty-four percent of people who reported their income under $25,000 were married and sixty-six percent of people were non-married

whereas sixty-three percent of people who reported their income between $25,000 and $49,000 were married and thirty-seven were non-married. As the disparity was found more in higher education between married and non-married groups in 2010 CPS, the same was true for higher income brackets. About seventy-eight percent of people who reported their income $75,000 and over were married and twenty-two percent of people were non-married (Current Population Survey: Version 3.0. 2010).

Due to the greater commitment in marriage, the relationship between spouses may be more influential than other relationships (Holt-Lunstad et al., 2008). Married older adults tend to report that their spouse is their closest social relationship (Abbey et al., 1985). In addition, spouses often provide life satisfaction through intimate relationship and social isolation avoidance (Hong & Duff, 1997). Hong & Duff (1997) interviewed 796 older adults including people who were married (52.6%), widowed (35.3%), divorced or separated (14.9%), and never married (14.9%) who lived in retirement communities. The married participants reported that their most important source of life satisfaction came from their spouse as compared to other potential significant others which included friends and children. The second source of satisfaction came from participating in community activities and the third source of satisfaction came from seeing friends. The authors suggest that the spousal satisfaction may be due to fact that this relationship provides satisfaction to many needs including the need for intimacy as well as the need for a good friend. Even if older adults were happy with their social environment in their retirement community, they were found favoring their spouses for support over children, other relatives and friends (Hong & Duff, 1997). They also found that the participants rated their friends over the children as a source of support in the hierarchy of relationships because they get to see and interact with friends on a more regular daily basis.

Marriage has been found to have many health benefits such as providing some protective effects in the regulation of blood pressure (Holt-Lunstad et al., 2008). Although blood pressure variable will not be measured or controlled in this study, it is important to acknowledge the role physical health can play in understanding cognitive ability (Zelinski, Crimmins, Reynolds, & Seeman, 1998). Both high and low blood pressure have been found to be associated to poor cognitive performance ( Molander, Gustafson, & Lövheim, 2010; Robbins et al., 2005; Thorvaldsson, Skoog, Hofer, Börjesson-Hanson, Östling, Sacuiu, & Johnson, 2011) and spousal relationship may lead to improvements in health in the long run (Holt-Lunstad et al., 2008).

As a result of stability and built-in social and emotional support that is usually embedded in marriage, married couples often report being happier and more satisfied with their lives than unmarried people (Holt-Lunstad et al., 2008). Holt-Lunstad and colleagues (2008) examined how marital status, relationship quality, and network support impact people's psychological wellbeing and cardiovascular health. Using Marital Adjustment Test (Locke & Wallace, 1959) and other measures, the researchers assessed the impact of the marital relationship and life satisfaction. They used subjective well-being to measure the life satisfaction. Holt-Lunstad and colleagues (2008) found that satisfaction with life was higher among married people than single people. However, participants with lower quality of marriages had significantly higher blood pressure than unmarried participants which suggests that quality of marriage is important for their well-being. They also found that an unhappy marriage did not shield people from unwanted effects of stress and depression. For example, the difference in blood pressure was not significant for participants who were not happy in their marriage and people who were single. Holt-Lunstad and colleagues (2008) suggest that being happily married is better than other relationships because of the intimacy that exists within a marriage. Similarly, Seeman and

colleagues (2001) posit that the benefits of marriage may also extend to better cognitive functioning and more independence in later years of life.

The mutual commitment between spouses may also help them fend off the environmental strains such as economic hardships (Kessler & McLeod 1985; Pearlin & Johnson, 1977). Pearlin & Johnson (1977) compared married people to unmarried people and studied how they dealt with daily life strains. Participants were interviewed on topics such as conflicts, frustrations and strains in the roles of occupation, marriage, childrearing, economic life, and their coping methods to strains. They were also asked about their emotional stresses and their symptoms such as depression and anxiety. The authors found that marriage did not appear to protect people from economic and social problems but it did seem to shield people from psychological strains that may arise from these economic and social problems. They posited that marriage may act as a barrier between life strains and depression. They suggest that marriage can provide people a stable, social, and emotional support structure which can serve as a substantial barrier against external strains (Pearlin & Johnson, 1977) whereas the emotional strains may hold the resources from executive control that strengthen the cognitive ability resulting into cognitive decline (Gerstorf, Hoppmann, Kadlec, & McArdle, 2009).

Does this mean that marriage at any cost provide health benefits? Hawkins & Booth (2005) compared the well-being of unhappily married people to divorced and remarried and divorced and unmarried people. They followed the unhappy marriages over a 12 years period. They found that staying unhappily married was not beneficial as they reported low self-esteem and worse overall health than divorced people. They also found that divorced people who remarried had greater happiness than unhappily married people and divorced people who stayed unmarried reported more satisfaction with life and reported better health than who stayed in

unhappy marriage. However, Waite and colleagues (2002) found that sometimes when unhappily married couples stay together long enough with each other, they become happily married.

With the advancement of medical science and public health practices, there has been a steady increase in life expectancy throughout the twentieth century. With age, older adults become more vulnerable to a variety of chronic diseases than young adults due to decreased physiological and biological reserves (Johnson, Backlund, Sorlie, & Loveless, 2000; Yang & Lee, 2009). Social support provides interaction and embeddedness which is defined by Johnson and colleagues (2000) as a sense of purpose or social role in society and this social interaction and embeddedness appears to shield married people from elevated risks of certain old age diseases. The researchers speculate that marriage provides an outlet for relieving stress as well as motivation for personal care which people can lack in the non-married groups.

### *2.3 Physical Health and Memory*

Prior research has studied the relationship between physical health and memory. Age does not cause the chronic diseases; as people age, however, they become more susceptible to certain old age diseases such as cardiovascular diseases, osteoarthritis, cancer, stroke and diabetes (Fontana, 2009). The onset of these chronic diseases can increase frailty and interfere with memory. Compromise in the physiological system may, in turn, bring cognitive impairment to some people in their old age (Dahle, Jacobs, & Raz, 2009; Holt-Lunstad et al., 2008; Hsu-Ko, Sorond, Iloputaife, & Gagnon, 2004; Seeman et al., 2001; Uchino et al., 1996).

### *2.4 Social Interaction and Memory*

Beside the marriage, other members in community such as friends and relatives also can provide social interactions and emotional support which have been found to provide health

benefits for people (Bassuk et al, 1999; Ertel, Glymour, & Berkman, 2008; Holt-Lunstad et al., 2008; Holtzman et al., 2004; Seeman et al, 2001; Spitzer, Llabre, Ironson, Gellman, & Schneiderman, 1992). Research suggests that interacting with different people makes older adults feel integrated into society. In their longitudinal analysis, Holzman et al. (2004) compared the cognitive functions of 354 adults aged 50 years and older across 12 years by using Mini-Mental State Examination (MMSE) scores and they found that cognitive ability was better maintained when people got emotional support through variety of social interactions including friends and relatives.

Social support also appears to mitigate the severity of stressful events. Uchino and colleagues (1992) examined the effects of aging, chronic stress, and social support on cardiovascular functioning in young and elderly caregivers. Thirty-six family caregivers of patients with Alzheimer's disease and 34 control subjects who did not have any caregiving duties between the ages of 30 –84 years were selected. Participants performed mental arithmetic such as counting backward and a structured interview. Social support was measured with Social Support Interview in which participants rated 10 important people in their lives with whom they have contact. Caregivers who had more social support showed less age-related increase in heart-rate reactivity during the testing than those caregivers who had less social support. The authors suggest that social support may diminish the impact of stressful events through emotional support (Uchino, Kiecolt-Glaser, & Cacioppo, 1992).

In another similar study, Seeman and colleagues (2001) examined the relationship between people's social engagement and their cognitive decline by using the existing data from the MacArthur Studies of Successful Aging (n = 722; mean age of participants = 74 years). Social relationships were positively associated with cognitive functioning. They found that level

of emotional support was predictive of cognitive performance (i.e. the higher the level of emotional support, the better the cognitive performance). The authors suggest that social networks may actually protect people from cognitive decline.

*2.5 Size of Network and Memory*

Size of social network in the community as well as frequency of network interaction have been found to provide health benefits (Ertel et al., 2008; Holtzman et al., 2004; Seeman et al, 2001). Larger social networks may provide more opportunity for emotional support as well as more cognitive stimulation than smaller social network. Holtzman and Colleagues (2004) examined the relationship between social network and global cognitive status using data from the Epidemiologic Catchment Area survey at the Baltimore site. The Mini-Mental State Examination MMSE was used to measure global cognitive functioning and size of the network was measured with survey item such as "the number of relatives and family members outside the household" and frequency of interactions was measured with survey items such as "the number of friends and neighbors with whom the participants kept in touch by phone or visits." They found that people's cognitive function was positively related to their larger social networks at baseline as people with larger networks maintained higher MMSE over 12 years. Also, there was a strong positive association between frequency of interactions with MMSE scores ($r = .86$, $< .001$). The authors suggest that this may be because larger social networks provide diverse cognitive stimulation and frequent consistent interaction and, therefore, protect them from cognitive decline.

In another study, Wang, Karp, Winblad, & Fratiglioni (2002) examined the relationship between social and leisure activities and cognitive decline. The participants ($n = 776$) were 77 years of age or older. Social network was categorized into four groups (1) extensive social

network including spouse or partner, children, relatives and/or friends; (2) moderate social network included two out of three extensive relationships; ( 3) limited social network included only one of three extensive network; (4) poor social network means being single and living alone without a child or close social ties. The findings show an association between social activities and cognition preservation. Based on their results, Wang and colleagues (2002) suggest that participating in frequent social activities in extensive social network which includes both friends and family provides a rich environment for interactive life which may help preserve cognition and hinder cognitive decline.

### *2.6 Quality of Interaction and Memory*

Seeman et al. (2001) argue that not only the size of network is an important variable in cognitive health, but the quality of relationships is also important. When there is harmony, understanding, and support in a relationship with minimal conflicts, people tend to rate their relationship with higher autonomy which, in turn, may lead to better subjective well-being. Conversely, when there are conflicts and inconsistencies in a relationship, it can make people feel disconnected which, in turn, can lead to reduced sense of autonomy (Merz & Huxhold, 2010). Merz & Huxhold (2010) examined how both emotional support and instrumental support may affect people's subjective well-being. They defined emotional support as receiving advice and comfort, and instrumental support as receiving help in cleaning and household chores. Using data from 1,146 participants who were 65 years of age or older in the German Ageing Survey, Merz & Huxhold (2010) divided participants into three groups: 1) those who did not receive any instrumental support; 2) those who received instrumental support from family members; and 3) those who received instrumental support from non-family people. Participants who rated their relationship with family and friends highly had higher subjective well-being than those who

reported poor relationship. They also found that receiving instrumental support can have a negative impact on the well-being of older adults because it often brings a feeling of dependency. However, improved quality of relations with family members and friends moderated the negative impact of receiving instrumental support. This study suggests that supportive relationship may help reduce cognitive health decline.

In another similar longitudinal study, Béland and colleagues, (2005) studied a community- dwelling older adults Spanish population (n = 372). Participants were evaluated using three measures: cognitive function (Leganes Cognitive Test), social network (social ties and social engagement with significant others), and social integration (membership and attendance in community, religious services, community center, and outdoor meeting place). Researchers collected data four times during the course of study. They found an association between social integration and family ties and cognitive function. Participants who associated with friends or participated in community activities exhibited fewer declines in cognitive function than participants who had less association with friends or did not participate much in community activities. These studies suggest that frequency as well as quality of interaction can help people maintain their health and well-being (Béland et al., 2005).

However, there are situations when having a large social network is not beneficial if the social network is not positive and/or supportive. For example, if one's social network is not providing a high quality of interactions, it may be perceived as a burden and negative. Pagel and colleagues (1987) studied the positive or helpful aspects as well as upsetting or negative aspects of social network over the course of one year. They defined positive aspects as being those that help and support the well-being of the person and negative aspects as social interactions that upset the person. They included 38 caregivers who were providing care to spouses who had

Alzheimer's disease. Four semi-structured initial interviews were conducted within the two week period and two follow-up interviews were conducted 8-12 months later. Participants provided perceptions about their stress that originated from their spouses' diseases and major changes in their lives as well as about their social network being helpful or upsetting. Participants were also asked to keep a daily log for two weeks about their experiences with people from their network list. In another interview, they were asked to review their social network list if they would want to delete a member or add a new member in their social network. In most cases, the caregivers kept their original list (91%). The authors did not find a relationship between the helpful/positive aspect of the network and depression and overall network satisfaction. However, if relationships were upsetting to the caregivers, the caregivers felt depressed and reduced satisfaction with their social network. The researchers suggest that positive social networks help maintain and negative social networks aggravate psychological disturbance. They posit that there is a good possibility that quality social relationships may support cognitive health (Pagel, Erdly, & Becker, 1987).

Although frequent social interactions with a larger network are positively related to cognitive health (Ertel et al., 2008; Holtzman et al., 2004; Seeman et al, 2001), it is unclear what type of social relationship affects cognitive health in older adulthood. According to Socioemotional Selectivity Theory, an older adult's social circle tends to become smaller because of motivational goals toward emotional intimacy and well-being as compared to younger adults who strive for large social networks (Carstensen, 1992; Fredrickson & Carstensen 1990). Older adults' motivational goals of emotional regulation may be in part due to affective gain because the familiar partners provide them more desirable positive affect and the new partners do not always provide them positive affect (Fredrickson & Carstensen, 1990). On the other hand,

young adults tend to put more emphasis on information gain and future contact which leads to increased social networks. In one of their two-part study, Fredrickson and Carstensen (1990) compared 80 participants of varying ages from 11 years old to 92 years old on the selection of their social partners. The older adults group of 40 participants comprised of 20 home-dwelling community residents and 20 nursing home residents. The researchers used three measures: health status, social traits, and perceived social support. By using the card-sort task participants rated their potential social partners with whom they could expect to spend their time socially. Participants sorted cards into different piles depending upon how similar they felt with the person and they would like to interact with these people socially or how dissimilar they felt with the social partners and they would not like to interact. At the end, the participants also expressed who they liked most in the card sort list and if thinking about someone they did not know before they declared if they would like to know them better. The researchers found that older participants gave more emphasis to the "affect anticipation" (selecting familiar partners) in their interaction while the younger adults put more emphasis on future contact or information seeking. They also found that nursing home older adults preferred the familiar social partners over the novel social partners. In the second part of their experiment, Fredrickson and Carstensen (1990) interviewed 380 community residents in the San Francisco and Los Angeles areas over the telephone under two conditions. In the first condition, the participants were asked the question: if you have half an hour of free time, with whom would you like to spend that time with? The choices included two novel social partners and one familiar social partner. In the second conditions, they were asked: "In just a few weeks, you plan to move across the country – by yourself and while preparing for your departure, you have half an hour of free time. Which person would you choose to spend that time with?" The participants were given the same three

choices as in condition one- two novel social partners and one familiar social partner. In this condition, the researcher tried to simulate the example of a social ending that many older adults face at this phase of their lives. The age of the participants varied from 11 – 92 years. In first condition, only 35% of the young participants chose the familiar social partners, however, in the second condition where there was an anticipated ending in relocation, a total of 80% of the young participants chose the familiar social partners suggesting that unspecified circumstances make people stick to familiar person. Fredrickson and Carstensen (1990) suggest that this feeling of nearness to death among older adults influence their partner selection limiting their social network. Harwood (2007) also suggests that older adults may want to focus more on close and familiar relationships that provide them most significant rewards. They prefer to have a quality relationship with fewer people than bigger networks with more peripheral relationships suggesting the shift in motivational goals in older adults.

During this phase of life (65+) when people usually retire from formal or informal jobs, who can alleviate the loneliness or social isolation among older adults without burdening the society and who can provide social interaction on a daily basis to older adults that can help stimulate their cognitive health? At this later phase of life, one's parents are often deceased and if the couple has children, they have either left the nest to establish themselves and/or are busy with their own lives. Although friends may be available, friendship does not usually carry the same expectations of caregiving. Out of all relatives and friends in network and based on our social structure, one's spouse seems to be the right choice who could provide social interaction, companionship and intimacy to each other (Hong & Duff, 1997; Schuster, Kessler, & Aseltine, 1990). In addition, it appears that having a spouse may alleviate loneliness and social isolation (de Jong Gierveld et al., 2009). According to Holt-Lunstad and colleagues (2008), people

typically find greater commitment, importance, investment, and/or intimacy in marriage which is not available in other relationship.

To date, many studies have been conducted that provide evidence of the beneficial effects between social interaction and physiological processes such as cardiovascular system as well as and psychological process such as depression (Luanaigh & Lawlor, 2008; Uchino el al., 1996). However, there have been limited studies conducted that provide evidence of a relationship between marital status and memory, particularly in old age. The purpose of this study was to identify whether there is a correlation between marital status and memory performance.

### *2.7 Research Question*

This study investigated the relationship between marital status, marital quality, and memory in a sample of married and non-married older adults. In addition, the characteristics of marriage and social interactions that may have positive impact on the memory of older adults were examined.

### *2.8 Hypotheses*

For this project, three hypotheses were explored:

1. The first hypothesis was that being married will be positively related to memory. Thus, the memory of married older adults will be better than single older adults.
2. The second hypothesis was that the participants with larger supportive social network will perform better on memory test than those who have small unsupportive social network. However, social network will be less significant for memory of married people than for memory of non-married people.
3. The third hypothesis was that the quality of married life will be positively related to memory for married respondents.

# 3 METHOD

## *3.1 Participants*

This sample was a convenience and non-random sample of population including only those who were willing to participate in this study without any monetary reward as there were funding constraints for the project. A total of 104 participants with various ethnic backgrounds and different cultures were recruited for this study. Participants included both men and women selected from the Metro-Atlanta area in Georgia. Participants were 60 years of age or older and were either married or non-married (single, separated/divorced, or widowed). Participants were recruited from different neighborhood senior centers: Naturally Occurring Retirement Communities (NORC) such as NORC at Toco Hills; Independent living facilities such as Christian Tower, Lutheran Tower; community centers such as Marcus Jewish Community Center from Dunwoody; adult day care, churches and temples where they have special groups of older adults such as "Not Too Old" (NTO) group. If the director or manager of the program agreed to allow advertisements about the study at their location, flyers about the study were posted throughout the above mentioned facilities (see Appendix B). Participants were also recruited using a "snow ball" technique whereby people recommended their friends for the study. On several occasions, the experimenter went to different facilities and gave a small presentation about the study to the residents/members. After the presentation, note cards were distributed to the seniors who showed interest in participating. These cards were used to provide their names and numbers and these potential participants were contacted later and invited to participate in the study. At some facilities, a sign-up sheet was used to recruit participants. Personal contacts were also used to recruit participants in the study. Participants were contacted from the list that was

prepared by the researcher to schedule the study time. The researcher contacted the building authority at each location to obtain a quiet room to conduct the study.

Although the sample was a convenience sample, purposive quota sampling method was also used. Participants were recruited until each group, married and non-married had at least 20 participants of each gender in each group. Participants were divided into two groups based on their marital status: one group of married older adults and another group of non-married older adults who were single, separated/divorced, or widowed. Criteria for inclusion for the married group were that participants should be married for at least 5 years or longer. Criteria for the non-married group were that they should be single, separated/divorced, or widowed for at least 5 years or longer.

### *3.2 Variables*

The dependent variable in this study was memory performance and the independent variables were marital status, marital satisfaction, size of social network, and quality of social interaction.

### *3.3 Setting*

All data were collected by one researcher and took place in a private quiet room located in either the facility from where participants were recruited or at the location of participant's convenience. Most participants participated at the recruitment location. For scheduling reasons, only a few participants requested the researcher to come to their homes. Questionnaires were administered individually and they were administered only by the student primary investigator. Participants were required to complete the questionnaire in one session. The data were collected between February and April 2012.

### *3.4 Measures*

Quantitative method design was used for this study. All participants completed a questionnaire (see Appendix A) composed of demographic questions modified by the researcher and four instruments that measured global cognitive ability, memory, satisfaction with life, and social network size. However, married participants also completed the Marital Adjustment Test. The instruments used in this study were: Marital Adjustment Test, The Satisfaction with Life Scale, Lubben Social Network Scale – 6, Mini Mental State Examination, and The Word Recall Test.

The demographic questionnaire included questions about marital status, age, race, ethnicity, education, and income. The demographic questionnaire also had questions about their living situation and safety of their living arrangements. In addition, the demographic questionnaire contained three questions that measured perceived memory and health and to assess the importance participants place on memory.

Marital Adjustment Test (MAT; Locke & Wallace, 1959) is a Likert-type response scale. The MAT measures the marital satisfaction and marital quality. The MAT has fifteen questions with six categories with 5 = always agree to 0 = never agree. The MAT includes questions such as how happy the participants are in their marriage and to what extent they agree on matters such as demonstration of affection, sex relations and philosophy of life. The MAT has a total possible score of 0 – 168 with higher scores indication better marital quality.

The Satisfaction with Life Scale (SWLS) is an assessment of global life satisfaction as it measures an individual's general sense of satisfaction with life (Pavot & Diener, 2008). This scale has five items with Likert-style responses ranging from 1 = strongly disagree to 7 = strongly agree with a total possible range of scores from 5 to 35. Higher scores indicate higher

life satisfaction. The reliability of SWLS ranges from 0.79 to 0.89 (Pavlot & Diener, 2009) which indicates that the scale has high internal consistency.

Lubben Social Network Scale – 6 is a measure of social network (Crooks, Lubben, Petitti, Little, & Chiu, 2008; Lubben, Blozik, Gillmann, Iliffe, Wolfgang, Beck & Stuck, 2006). It has six questions: three of the questions assess the social interaction with family members and relatives with whom the participants keep in touch or socialize regularly and the other three questions measure the social interaction with friends with whom the participants keep in touch or socialize regularly. Lubben Social Network Scale – 6 is a Likert-type scale with 6 choices: 0 = no member in the network and 5 = nine of more people in the network. The possible mean score for this test ranges between 0 – 30 with higher scores indicating larger networks.

Mini-Mental State Examination (MMSE; M.F. Folstein, Folstein, & McHugh, 1975) is a general test of global cognitive function. It also has three memory questions. The MMSE has 11 questions (scores range from 0 to 30) that cover several different areas of cognition, including orientation, registration, memory, attention, and language. This questionnaire is considered a valid, objective, and quantified assessment of global cognitive status.

The Word List Recall test consists of 30 categorizable nouns with 6 words from 5 distinctive taxonomic categories using norms from Howard (1980) such as metals, animals, trees, sports, and flowers. It measures both – Immediate & Delayed memory and it was constructed by Hertzog, Dixon, & Hultsch (1990). The Word List Recall had been widely used by researchers to assess the memory performance of people of different ages including older adults (Lachman, Andreoletti, & Pearman, 2006; Pearman & Lachman, 2010). The scores are recorded as number of words correctly recalled on each trial.

### *3.5 Apparatus*

To maintain confidentiality, participants were not required to provide their names on the questionnaire. Questionnaires were given identification (ID) numbers once completed. The information participants provided was stored in the principal investigator's office in the locked cabinet. Only the ID numbers were used in data files to make the study confidential. Other facts that might point to participants will not appear when this study will be presented or discussed with others. The findings are summarized and reported in group form. The data from the questionnaires were entered into statistical software called Predictive Analysis Software (PASW). The electronic files were password protected and stored in a password protected computer at the Georgia State University (GSU) Gerontology Institute. Also when results are published in future, individual participants' information will not be identified at any point.

### *3.6 Procedure*

Once the Internal Review Board at GSU approved the study, the researcher started recruiting participants by giving presentations about the study at different facilities. Participants either participated immediately or provided contact information to schedule at a later date. Once participants agreed to take part in the study, the researcher explained the informed consent process. Participants were given a printed copy of the consent form. The researcher read over the form with them and asked if they understood. The participants were then asked to sign the form. The researcher retained the signed portion of the consent form and participants were given the remaining consent form.

On the day of questionnaires were administered, the consent form was the first form given to the participants. The researcher explained the purpose and main points of the study to the participants. Once the consent form was signed, participants were given MMSE test. MMSE

served as the initial screening tool as this test can be scored right on the spot. If participants successfully completed the MMSE, they continued the study; however, if participants were not able to complete the MMSE, they were provided the referral sheet and they were dismissed at this point without getting any further into the study. Dismissing participants at this stage occurred only 5 – 6 times during the whole study. The referral sheet contained the contact information of some local resources and some national resources about aging services to connect older adults to specialists in the memory area.

If participants successfully completed the MMSE, they continued the survey. First, they were given the instructions about the Word List Recall test. Participants were instructed about the two phases of first Word List Recall test: study phase and recall phase. They were told that study phase will be for three minutes in which they will review the words; however, for the recall phase there was no time limit. After the instructions, the word list was given to participants to study for three minutes. After three minutes, the word list was taken away from the participants and the Recall Sheet One was provided and participants were asked to write as many words as they could remember. Participants were told to put the pen down once they felt that they could not remember any more to let the experimenter know that they were done. Although there was no time limit for writing the words on the recall sheet, after three minutes the experimenter asked participants who were not finished if they need more time. Once they were done, the first recall sheet was taken away from the participant. This completed the first trial of the Word List Recall test. During the second trial, participants were given the word list again and asked to review the word list for one additional minute. After one minute was over, they were provided the Recall Sheet Two and asked to write all words again on the sheet. As in the first Word List Recall trial,

participants were again told in the second trial to put the pen down once they felt that they could not remember any more words.

After the second trial of Word List Recall test was completed, demographic questionnaire was given to collect information about their marital status, age, education, socioeconomic status, their living arrangements, and how they perceive their health and memory. After the completion of demographic questionnaire, participants were given one of the two packets of questionnaires depending upon their marital status: one that included MAT, SWL, and Social Network Scale-6 if the participants were married or the other that included only SWL and Social Network Scale-6 if they were single, divorced/separated, or widowed. Once they completed this portion of survey which usually took between 10 – 14 minutes, they were asked to write the word list one more time on the third Recall Sheet Three to measure delayed memory. If participants took less than ten minutes to complete the remaining surveys, they were asked to wait to elapse the twenty minute period between the first Word List Recall test and the third Word List Recall test. After completing the survey, the researcher asked if participants had any questions and thanked them for their time. At the end, all participants who were concerned about their memory were provided the referral sheet compiled by the researcher. More women than men expressed concerns about their memory. Completing the whole study usually lasted between thirty to forty minutes.

### *3.7 Analyses*

Predictive Analysis Software (PASW) 18 was the statistical program selected to conduct analyses of the data. Data were analyzed by marital status (married older adults and non-married older adults). Initially, all measures were analyzed using descriptive statistics to provide

demographic characteristics of the sample. For the second analysis, independent samples t-test was used to compare the two marital status groups for each study variable. Analysis of covariance was also used to compare the differences between the married and non-married groups while controlling for age and education differences between the groups. A third analysis using Spearman correlation coefficient was conducted to explore the relationship between the study variables.

# 4 RESULTS

## *4.1 Descriptive Analyses*

Descriptive analyses were conducted to identify the demographic characteristics of the sample. There were total of 112 who participated in the study, however, data from only 104 participants fit the inclusion criteria of being married, single, divorced, separated or widowed for five years or longer (see Table 1a). Out of 104 participants, forty-three percent were male and fifty-seven percent were female. Forty-seven percent of participants were married whereas fifty-three percent participants were non-married. Participants ranged in age from 60 to 90 years with a mean age of 73.4 years and standard deviation of 7.8. Most participants were Caucasian (66%) whereas 16% of the participants were Black/African American, and 9% of the participants were of other races including Chinese, Japanese, and Indian origin.

The majority of participants (53%) who reported having post-graduate education were married and only twenty-four percent non-married participants reported having post graduate education. About twenty percent of married people as well as non-married people reported completing college, and twenty-four percent of married people had some college education. More non-married participants (18%) reported having high school education where as only four percent married participants reported having high school education. Only eight percent of the married population reported having less than high school and only nine percent non-married participants reported having less than high school education.

Overall, sample was evenly distributed in five income levels except one category of $10,000 – 25,000 in which 27.2% of participants reported their income. However, majority of non-married participants reported to have income less than $50,000 whereas, married participants reported income above $25,000. The majority of married people reported living

with their spouse whereas non-married people lived alone. Most participants reported their health good or excellent (67%) and very few people reported their health in poor condition (< 10%) (see Table 1b). In addition to descriptive statistics, an independent t-test was performed on some of the demographic variables such as age, level of education, and income to see the differences between the married group and non-married group. Independent t-test revealed that there was a significant difference between the married and non-married groups on these variables as married older adults did better on the Word List Recall than non-married older adults.

*4.2 Word Recall and Marital Status*

The first hypothesis states that married older adults will perform better on the memory test than non-married older adults. The Word List Recall test was used to measure memory (Hertzog et al., 1990; Howard, 1980). The Word List Recall scale ranges from 0 – 30. For this sample, the mean Word Recall score was 16.28 and responses ranged from 3 - 29.

Analyses show that the Word List Recall score for married group was 17.7 with a standard deviation of 6.2 (see Figure1) and the Word List Recall score for non-married group was 14.9 with a standard deviation of 5.7 (see Figure 2). There was a three point difference in the average Word List Recall score for married and non-married participants. To further analyze this hypothesis, an Independent t-test was conducted on marital status and the Word List Recall. The findings illustrated that there was a significant difference between the married group and non-married Word Recall scores. Married participants performed significantly better than the non-married participants (-[$t$ (102) = 2.60, p = 0.01]).

Table1a.

*Demographic Characteristics of Participants*

| Characteristics | Married | | Non-Married | | Total | |
|---|---|---|---|---|---|---|
| | n | % or M | n | % or M | n | % or M |
| Gender | | | | | | |
| Men | 24 | 49 | 20 | 36 | 44 | 42 |
| Women | 25 | 51 | 35 | 64 | 60 | 58 |
| | | | | | | |
| Age in Years* | | M73.4 | | | | |
| 60 – 70 | 26 | SD7.8 | 17 | 31 | 43 | 41 |
| 71 – 80 | 15 | 53 | 20 | 36 | 35 | 34 |
| 81 – 90 | 8 | 31 | 18 | 32 | 26 | 25 |
| | | 16 | | | | |
| Level of Education* | | | | | | |
| Less than High-School | 2 | | 5 | 9 | 7 | 7 |
| High-School | 2 | 4 | 10 | 18 | 12 | 12 |
| Some College | 9 | 4 | 16 | 29 | 25 | 24 |
| College Graduate | 10 | 18 | 11 | 20 | 21 | 20 |
| Post Graduate | 26 | 20 | 13 | 24 | 39 | 38 |
| | | 53 | | | | |
| Income* | | | | | | |
| $10,000 or less | 1 | | 12 | 24 | 13 | 14 |
| $10,000 to $25,000 | 5 | 2 | 23 | 47 | 28 | 29 |
| $25,000 to $50,000 | 7 | 11 | 10 | 20 | 17 | 18 |
| $50,000 to $100,000 | 17 | 15 | 3 | 6 | 20 | 19 |
| $100,000 or more | 16 | 37 | 1 | 2 | 17 | 18 |
| | | 35 | | | | |
| Race | | | | | | |
| White | 35 | | 34 | 68 | 69 | 74 |
| Black/African American | 3 | 81 | 13 | 26 | 16 | 17 |
| Others | 5 | 7 | 3 | 6 | 8 | 9 |
| | | 12 | | | | |
| Ethnicity | | | | | | |
| Hispanic | 2 | | 3 | 6 | 5 | 5 |
| Not-Hispanic | 43 | 4 | 46 | 94 | 89 | 95 |
| | | 96 | | | | |
| Living Situation | | | | | | |
| Living Alone | 7 | | 46 | 65 | 53 | 42 |
| Living with Spouse | 40 | 13 | 1 | 1 | 41 | 32 |
| Living in Retirement Home | 9 | 71 | 24 | 34 | 33 | 26 |
| | | 16 | | | | |

Note: Independent *t*-test * $p \leq .01$

Table1b.

*Additional Characteristics of Participants*

| Characteristics | Married | | Non-Married | | Total | |
|---|---|---|---|---|---|---|
| | n | % M | n | % M | n | % M |
| Overall Health Compared to Peers | | | | | | |
| Excellent | 9 | 53 | 8 | 47 | 17 | 16 |
| Good | 22 | 42 | 31 | 58 | 53 | 51 |
| Average | 15 | 63 | 9 | 38 | 24 | 23 |
| Fair | 3 | 33 | 6 | 67 | 9 | 9 |
| Poor | 0 | 0 | 1 | 100 | 1 | 1 |
| Overall Health Compared to Peers | | | | | | |
| Excellent | 3 | 42 | 4 | 57 | 7 | 7 |
| Good | 15 | 39 | 23 | 61 | 38 | 37 |
| Average | 24 | 62 | 15 | 38 | 39 | 38 |
| Fair | 6 | 43 | 8 | 57 | 14 | 13 |
| Poor | 1 | 17 | 5 | 83 | 6 | 6 |
| How Important Your Memory | | | | | | |
| Couldn't be More Important | 11 | 48 | 12 | 52 | 23 | 22 |
| Very Important | 35 | 48 | 38 | 52 | 73 | 70 |
| Somewhat Important | 3 | 43 | 4 | 57 | 7 | 7 |
| Not at all Important | 0 | 0 | 1 | 100 | 1 | 1 |

Table 2.

*Independent t-test for Word List Recall by Marital Status and Gender*

| | Variable | N | M | SD | Min | Max | Range | T |
|---|---|---|---|---|---|---|---|---|
| Marital Status | Married | 49 | 17.7 | 6.2 | 5.7 | 29 | 23 | -2.60* |
| | Non-Married | 55 | 14.9 | 5.7 | 3 | 28 | 25 | |
| Gender | Men | 44 | 17.9 | 6 | 3 | 29 | 26 | |
| | Women | 60 | 16 | 6 | 6 | 29 | 23 | |

Note: * $p \leq .01$

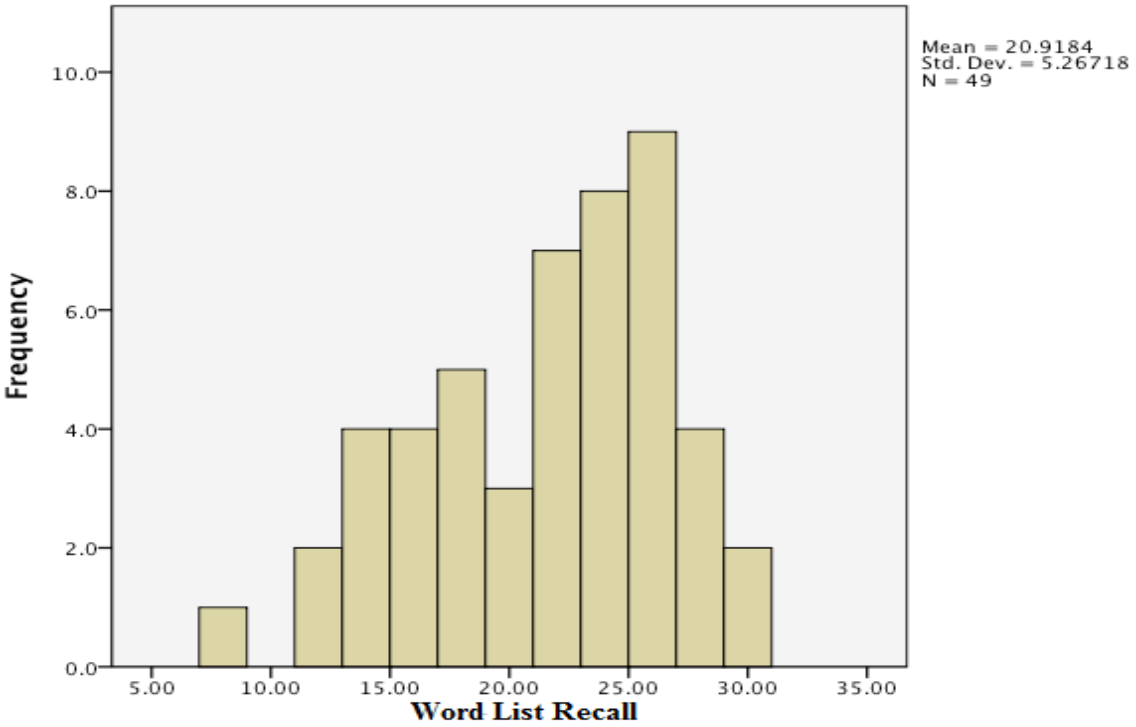


Figure 1. *Histogram of Word List Recall for Married Participants*

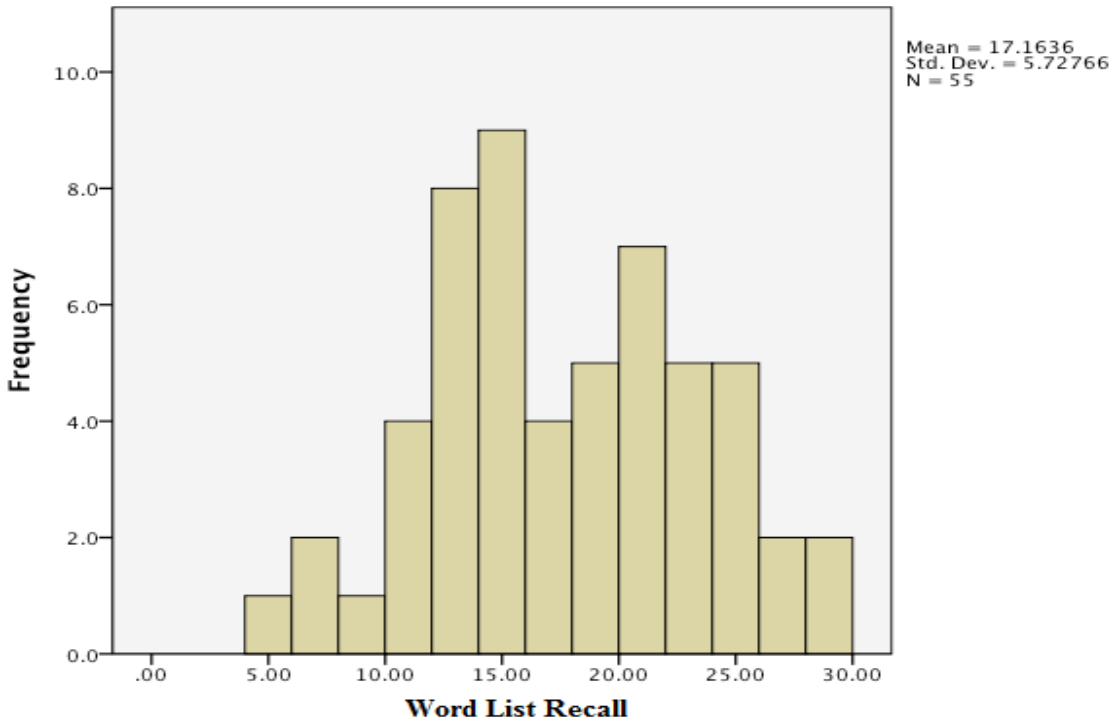


Figure 2. *Histogram of Word List Recall for Non-Married Participants*

Table 3.

*Univariate Analysis of Variance Between-Subject Effects (controlling for age)*

| Source | Mean Square | df | F | Sig (2tailed) |
|---|---|---|---|---|
| Age | 367.74 | 1 | 11.53 | .001** |
| Married vs. Non-Married | 84.28 | 1 | 2.6 | .107 |

Note: * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

To further explore the relationship between marital status and memory, additional analysis such as, Analysis of Covariance (ANCOVA), was performed. After controlling the age and education, the difference between married and non-married groups was not significant. This suggests that the variance is not explained by marital status, but by age and education differences of the sample. These differences are probably due to the non-random sampling conducted in the study.

*4.3 Lubben Social Network Scale – 6 and Memory*

The second hypothesis states that participants with larger supportive social network will perform better on memory test than those participants who have smaller unsupportive social network. The size of social network was measured by the Lubben Social Network Scale-6 (Lubben, et al., 2006). Lubben Social Network Scale-6 consists of two parts – family Lubben and friend Lubben and this test has the capability of measuring the differences between family and friend network. The Lubben Social Network Scale -6 scores ranges from 0 – 30. The total Lubben score is the sum of both subscales – family Lubben and friend Lubben (see Figure 3).

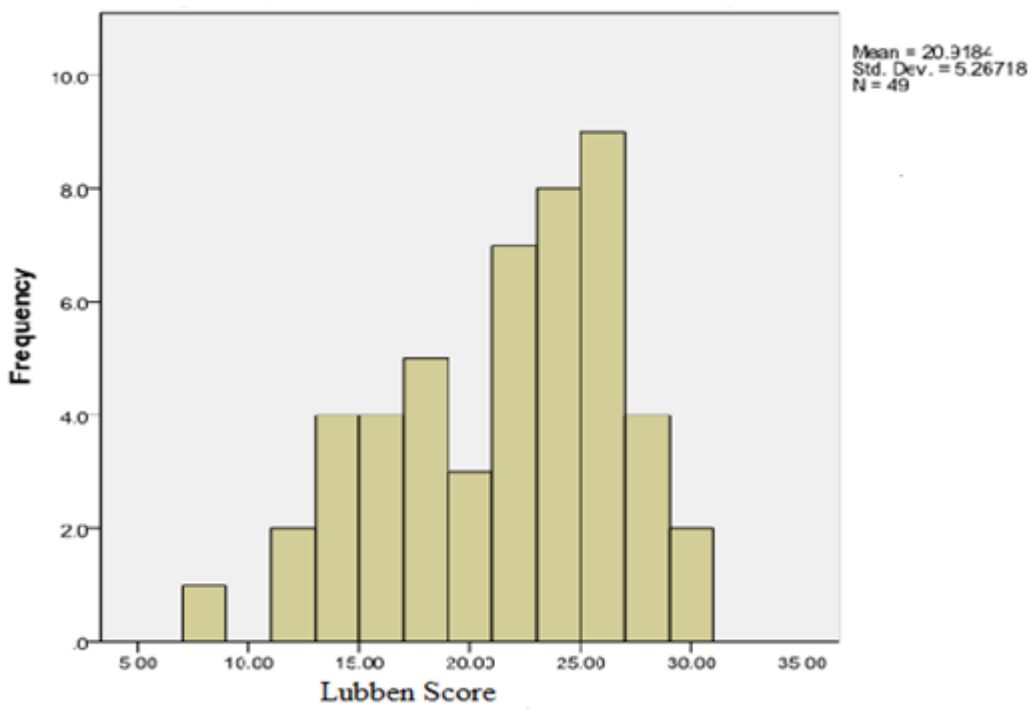


Figure 3. *Histogram of Lubben Score for Married Participants*

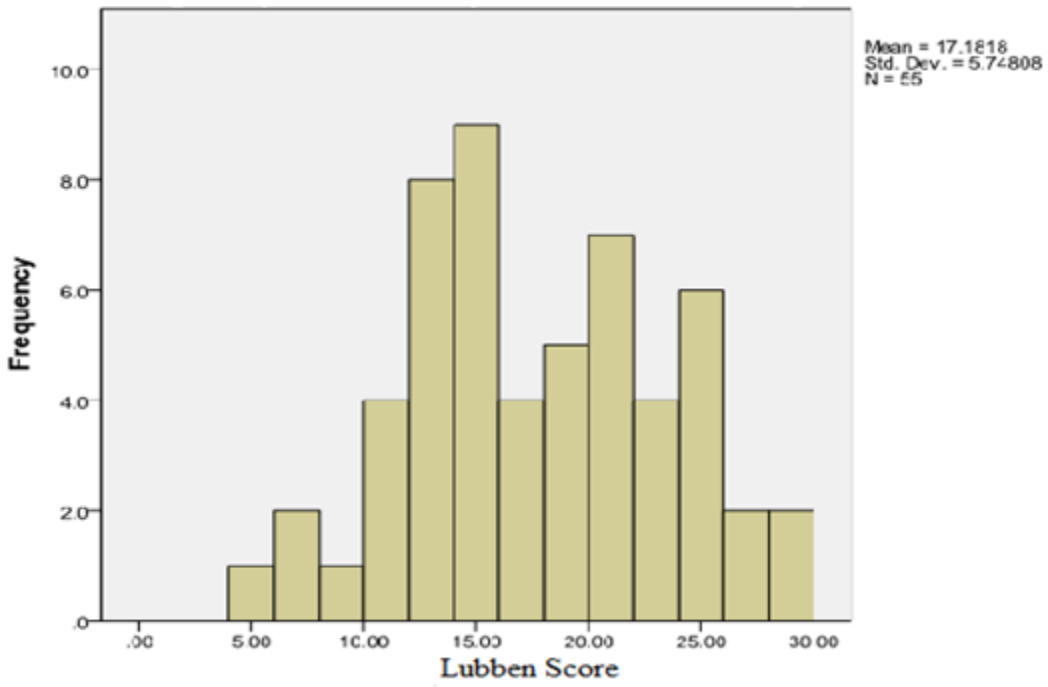


Figure 4. *Histogram of Lubben Score for Non-Married Participants*

Both groups of participants reported having a social network between 8-29 people in their social network (see Table 4). Three married participants scored twelve or lower score whereas eleven non-married participants scored twelve or lower score. The Lubben score for married respondents was 20.8 with a standard deviation of 5.3 and the Lubben score for non-married respondents was 18.1 with a standard deviation of 9.4. There was almost three point difference in the Lubben mean score between married and non-married participants. To further analyze this hypothesis, the Pearson correlation was conducted on the Lubben Social Network and the Word List Recall. Although married people average score was higher than non-married group, the Lubben Social Network scale - 6 was not found to be correlated significantly to the Word List Recall for either group (see Table 5). The trend, however, was for married people with smaller social networks to have better memory performance (r=-.16).

Table 4.

*Lubben Score and Marital Status*

| | N | M | SD | Range |
|---|---|---|---|---|
| Married | 49 | 20.8 | 5.28 | 5 - 29 |
| Non-married | 55 | 18.07 | 9.43 | 8 - 29 |

Table 5.

*Correlations between Lubben Social Network and Memory*

| Variable | | Word List Recall | Lubben Score |
|---|---|---|---|
| Married | WordListRecall | 1 | -.164 |
| | LubbenScore | -.164 | 1 |
| Non-Married | WordListRecall | 1 | -.003 |
| | LubbenScore | -.003 | 1 |

Note: * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

Table 6.

*Univariate Analysis of Variance Tests of Between-Subjects Effects*

*Dependent Variable: Word List Recall*

| Source | Mean Square | Df | f | Sig |
|---|---|---|---|---|
| Age | 515.10 | 1 | 15.77 | .000 |
| LubbenScore | 4.88 | 1 | .149 | .700 |

Note: * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

An ANOVA also revealed that relationship between Lubben and Word List Recall was not significant when age was controlled for (see Table 6). These results do not support the second hypothesis that is respondents with larger supportive social network will perform better than respondents with smaller unsupportive social network.

*4.4 Satisfaction with Life, Quality of Life, and Memory*

The third hypothesis states that quality of married life will be positively related to memory for married participants. To test this hypothesis, two measures were used- SWLS (Pavot & Diener, 2008) and MAT (Locke & Wallace, 1959). SWLS was used to measure the overall life satisfaction and was given to all participants whereas the MAT was used to measure marital satisfaction and marital quality and was administered to married participants. The SWLS has five items and each item's possible score ranges from 1 – 7 with the total possible scores of 5 to 35. Higher score indicate higher satisfaction with life. The MAT has fifteen questions with six categories. The score for the MAT ranges from 2-168 and higher score indicate higher marital satisfaction.

Analysis show that the SWLS mean score for married respondents was 28.3 with a standard deviation of 6.7 and the SWLS mean score for non-married respondents was 25.3 with a

standard deviation of 6.2 (see Table 7). Fifty-four percent of married men reported being extremely satisfied whereas none of the non-married male participants reported to be extremely satisfied. On the other hand, 38% married women reported to be extremely satisfied whereas only 26% of non-married women reported being extremely satisfied.

Table 7.

*Satisfaction with Life and Marital Status*

| | N | M | SD |
|---|---|---|---|
| Married | 55 | 28.3 | 6.7 |
| Non-married | 49 | 25.3 | 6.2 |

Table 8.

Correlations Between Life Satisfaction, Marital Adjustment, and Memory

| Variable | 1 | 2 | 3 |
|---|---|---|---|
| WordListRecall | 1 | -.054 | -.100 |
| TotalSatisfaction | -.054 | 1 | .445** |
| MartitalAdjustmentTest | -.100 | .445 | 1 |

** $p \leq .001$ (2tailed)

The average MAT score for married participants was 124 with a standard deviation of 16.9. Pearson Coefficient Correlation between the SWLS, MAT, and the Word Recall was performed to further analyze the hypothesis. There was no relationship between the SWLS and the Word List Recall. In addition, there was no relationship between MAT and the Word List Recall (see Table 8). Therefore, the third hypothesis was not supported. However, there was a significant relationship between life satisfaction and marital adjustment (r= .445) (see Table 8) suggesting that married individuals in better relationships are more satisfied with their lives.

# 5 DISCUSSION

## *5.1 Overview*

This study was designed to investigate marriage and memory in older adults. The size of supportive social network, quality of married life, and memory were also investigated in older adults. Memory was measured using the Word List Recall scale. The hypotheses were not supported by the results. The population in this study was similar to general population in many characteristics such as education and income. As the table 1a reports that more married participants reported having higher education than non-married participants, a trend in the general population. The same was true for income. More married participant reported having higher income ($50,000 or more) and more non-married participants reported having lower income ($50,000 or less) (Current Population Survey: Version 3.0. 2010). This chapter will explain the findings in the context of existing research. In addition, it will address study limitations and recommend directions for further study.

## *5.2 Marital Status*

The first hypothesis was that married older adults will perform better on memory test than non-married older adults. Preliminary analysis suggested that that married older adults did perform significantly better on the Word List Recall test than non-married older adults. However, these differences in the mean scores of Word List Recall between married and non-married groups were not significant when age and education were controlled. The descriptive analysis tells us that non-married group in this sample is 4.5 years older than married group. Given that the sample of married adults is significantly younger and more highly educated than the unmarried sample, it is not surprising that they performed better on a memory task. It is well accepted that memory declines exponentially with age and that highly educated people always do

better on verbal memory tests than people with less education. Given the non-random nature of the sample, controlling for the age and education, differences was the only way to test hypothesis one which was not supported in this analysis.

Extant research found a relationship between marital status and memory. For example, van Gelder and colleagues (2006) found that married men who lived with others had the smallest cognitive decline whereas the non-married men who lived alone had double the cognitive decline. These researchers suggest that cognitive stimulation from the partner may provide protective interaction and the satisfaction with life gained from this interaction may be protective from cognitive decline (van Gelder, Tijhuis, Kalmijin, Giampaoli, Missinen, & Kromhout 2006). Holt-Lunstad and colleagues (2008) also suggest that marriage may provide the protective effects to married older adults influencing their physical health which, in turn, may be protective against cognitive decline as physical health has been found to affect cognitive health (Holt-Lunstad et al., 2008; Hsu-Ko et al., 2004; Seeman et al., 2001; Uchino et al., 1996). However, this study suggests that additional factors such as age, education, and income are more significant than marital status.

There could be few possible reasons that there was no significant difference in memory performance for the two groups – married and non-married in this study. One of the explanations for this could be that although marriage does provide spouses social interaction to consistently stimulate memory, married people are not getting enough stimulation because of similar interests or their physical health is stressing them out to consistently stimulate memory. It is possible that married participants in this study might be going through the burden for care of the spouse (some of the participants did mention taking care of their spouse) which might be having negative effect on their cognition (Seeman et al., 2001). On the other hand, non-married

older adults may be receiving social support from other sources in the community or this new cohort of older adults who live alone may actively be seeking social interaction from other people. The findings from this study suggest that marriage is not a strong predictor of memory performance. In general, marriage may not be universally beneficial, particularly in older age or the positive effects of marriage on health may be reduced in old age.

For some married people, marriage may be limiting when people reach old age (Shiota & Levenson, 2007). For instance, people who marry those of similar interests and similar personalities tend to have higher relationship satisfaction. However, similar personalities for spouses with marriage may not provide enough cognitive stimulation as spouses with diversified personalities which can bring wider range of skills and stimulations to life (Shiota & Levenson, 2007). As a consequence, these older married people may find themselves becoming bored with each other as Shiota & Levenson (2007) state that "birds with too-similar personalities may face increasing difficulty in flying together over time" (p.672). In contrast, non-married people have the opportunity and freedom to interact with more interesting people. This interaction, in diverse social situations, may provide them more cognitive stimulation.

Another plausible reason for no difference in married and non-married groups on the Word List Recall score could be that absence of spouse in non-married group can make people more self-reliant as they have to manage all aspects of their life on their own which, in turn, can influence person's memory (Seeman et al., 2001).

Another reason for no difference in married and non-married groups on the Word List Recall score may be that as people age, they may encounter many problems- financial, emotional, or physical illness, which could be very detrimental to the spousal relationship. For instance, if one person develops the physical illness which is very common in old age, one's

sickness affects not only just the patient but both partners -emotionally and financially. The healthy partner usually assumes the responsibilities of a caregiver which consumes his/her time as well as energy. In many situations, death of the patient or divorce is the only option to set the healthy partner free and both of these scenarios can have deleterious effects on the survivor which, in turn, may have negative impact on memory (Seeman et al., 2001).

Although, marital dissolution, either by divorce or widowhood, could be disruptive to life as different reasons such as sickness of the one spouse brings the divorce or death of a spouse is also common in old age, these effects may be short lived (Shapiro & Keyes, 2008). Once the spouse becomes free of caregiving duties, they can invest time in their own health by seeking out the opportunities to keep themselves busy and entertained. For instance, several of the facilities where data was collected for this study, provide educational activities for seniors and are mostly frequented by the non-married older adults.

## 5.3 Social Interaction

The second hypothesis, which predicted that participants with larger supportive social network will perform better on memory test than those who have small unsupportive social network, was not supported. In this sample, married and non-married groups had almost similar size of social network as both groups reported having 8 – 29 people in their network. Although fewer married respondents reported having less than twelve people in their social network than non-married respondents, the difference was not significant.

However, this sample was unique in two ways. First, participants in this sample had much higher numbers of people in their social networks than clinical cut point of less than twelve (Lubben et al., 2006). Older adults may score less than six on one of the sub-scales if they lack either family or friendship ties, but they should compensate on by the other type of social ties to

avoid social isolation. Lubben and colleagues (2006) suggest that individuals who score less than six on each sub-scale or less than twelve overall might be at increased risk of social isolation which can lead them to physical as well as to mental health problems. Bassuk and colleagues (1999) also confirm these findings that higher social disengagement leads to greater cognitive decline as they state in their article "odds of experiencing cognitive decline were twice as great in the most disengaged respondents than in the most engaged respondents" (p.170). In this study, both the married and non-married samples reported higher numbers of contacts in their social networks. These larger social networks may indicates that having more social ties kept these respondents physically active as well as cognitively stimulated to stay mentally sharp.

Another reason for this hypothesis not being supported in this study could be that participants in both groups - married and non-married had very similar types of social networks. Besides having a large social network, both groups of people reported having diverse social network. Diverse social network has been found to be beneficial for the cognitive health of older adults as studies show that diverse social network which include family, friends, and formal relationships has more positive impact on memory than restricted social network (Giles, Glonek, Luszcz, & Andrews, 2005**;** Fiori, Antonucci, & Cortina, 2006; Litwin & Shiovitz-Ezra, 2010). Diverse social network has been defined having both family members and friends whereas restricted social network has been defined having fewer people and very limited social ties (Litwin, 2001). Although both relationships – family and friends– have been identified as very important for the well-being of older adults, relationship with friends have been found to have a positive effect on the psychological well-being of older adults (Antonucci & Akiyama, 1995). According to Litwin (2001), social ties with friends influence the health and morale of older adult because they are more elective than obligatory. With family relationships, people do not

have as much choice in substituting them if the relationships create constant stress or they are detrimental to well-being. Whereas friend relationships are more optional and they typically are established and maintained by mutual consensus of common experiences, interests, values, affection, and reciprocity (Antonucci & Akiyama, 1995). This ability to choose a friend or be chosen as a friend over many other alternative individuals also makes people feel special and desired. Another important factor of differential influence between friend and family relationship could be attributed to role as family members. Unlike friends, family members are not matched on age or sex (Antonucci & Akiyama, 1995).

### 5.4 *Satisfaction with Life and Quality of life*

Contrary to the prediction of third hypothesis that the quality of married life will be positively related to memory for married respondents, this hypothesis was not supported. Memory performance was not related to marital satisfaction or to overall life satisfaction.

Although life satisfaction and marital adjustment did not make a significant difference on the Word List Recall score, there was a statistically significant relationship between life satisfaction and marital adjustment. This finding conforms to the previous studies that the spouse is an important source of life satisfaction for married people (Hong & Duff, 1997) as these researchers suggest that due to the similarities in structural characteristics, such as common lifestyle and constant contacts with each other, spousal relationship can provide the most life satisfaction.

### *5.5 Possible Limitations*

As in any study, there are a number of limitations in this study. These include the non-random sample, size of the sample, and the way memory was measured. It was a sample of convenience and the resulting non-random sample may have skewed the findings and does not

allow for generalization. For example, because the majority of the sample was collected from participants active in community groups (senior centers, NORC, or retirement community), they are more likely to be healthy and socially engaged than the general population of older adults. In addition, because several categories such as married women were more difficult to recruit, they may have been pulled from different groups and as a result they also may not represent the general population of older married women. Also, the non-random sampling probably contributed to the education and age differences between the groups. Future studies might collect the sample by matching participants on age and education. This would allow for more comparable samples of married and non-married participants.

As mentioned previously, there were some significant differences in the married and non-married groups (see Table 1a). The married group was on average 4.5 years younger than the non-married group. Differences in education and income level also existed in both groups. There were twice as many married participants than non-married participants who had post-graduate education. Seventy percent of the married participants reported their annual income $50,000 or more whereas only eight percent of non-married participants reported their annual income of $50,000 or more. These differences should be controlled in any future studies, either by matching or statistically.

Another potential limitation could be the memory measurement used in the study. The Word List Recall test selected to measure the memory may not have captured the memory of the participants as it measures only one type of memory. Also, the Word List Recall may only be measuring memory in a very narrow way which could not be a true predictor of cognitive health. It is also possible that the Word List Recall produced anxiety in participants as some of them reported feeling anxious and that could have skewed the results in this study. Motivation for

success could also be an issue as some of the participants took the test more seriously and tried harder to recall more words than others as the Word List Recall may work differently for married and non-married & educated and less educated participants. In addition, the Word List Recall may not have the same meaning for people who come from other cultures than the main stream population. Some other memory tests such as California Verbal Learning Test might have yielded better results.

Also, a longitudinal study design might have been a better design to see the effects of marital status, social network, and quality of relationship; however, time constraints did not permit the researcher to conduct such a study.

### *5.6 Future Research*

Despite these limitations, the results of current study provided some significant findings about this new cohort of older adults. Life is very complex and one cannot take the topic of marriage without considering many other variables, especially when exploring memory. A larger and more diverse sample size could help determine a significant trend. For example, in this study, the trend was to have better memory performance for the married people with smaller networks. So, a larger sample may help determine this trend. Also the diversity of the sample may truly represent the population. The current study is one of the only studies to explore the relationship between social interaction and memory and teasing out the factor of marriage.

Future studies could be beneficial if the researchers could control the participants' anxiety. In general, people, particularly older adults, do not like to be tested for their memory. The thought of memory test brings anxiety in many older adults. The presence of the researcher did not help alleviate the anxiety as many people tried to please the researcher and this anxiety could have influenced the results of this study.

Future research should also include a constant environment for the study. Any environmental distraction can influence the findings. Also, to gain a more comprehensive understanding of social interaction and memory among older adults, future researchers should consider using a mixed-method study (both quantitative and qualitative) to capture their emotions and concerns that are representative of their lives. Besides by pinpointing what helps memory in old age would be very crucial as many baby-boomers are reaching to their old age and to keep older adults in community longer, it is important to find out what helps their memory.

# 6 CONCLUSION

While most of the hypotheses in this study were not supported, results from this study do provide a better understanding of the relationship between marital status and memory performance. For example, the study demonstrated that non-married older adults are not living in seclusion as they are stereotypically perceived. As the findings from this study show that non-married older adults have similar size of social network as married older adults, it appears that non-married older adults are reaching out to other people which may be helping them avoid social isolation. Non-married older adults are also getting involved in many programs run by local government such as Life Enrichment Centers and NORC programs which help them stay busy as well as fulfill their long lost hobbies. These programs not only keep older adults busy, they also keep them cognitively stimulated. Also marriage is not the only thing going on in the lives of married older adults; there are many other variables such as education and socio-economic status that may have influence on their memory.

These findings help us understand the relationship between other variables such as perceived social support, quality of marital relationship, and life satisfaction and memory as well. Furthermore, the results suggest the importance of living situation as one cannot force a marriage at this age, however, one can provide an opportunity for a diverse and supportive social interaction which could provide satisfaction with their lives. Overall, the current study reveals a promising direction for future research to build on these results but include other methods as well as variables which could help understand how to keep memory intact in older adults.

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# 8 APPENDECES

*Appendix A*

## Participant Information Questionnaires

1. **Partnership Status (check *one*):**
   - ○ Married. How long have you been married? _____
   - ○ Separated. How long have you been separated? _____
   - ○ Divorced. How long have you been divorced? _____
   - ○ Co-habitating (living with someone). How long have you been cohabitating? _____
   - ○ Widowed. How long have you been widowed? _____

2. **Sex (circle):** Male Female

3. **Age: _____**

4. **Please check the category that best describes your ethnicity or ethnic origin:**

   ○ Hispanic or Latin American ○ Not Hispanic ○ I do not wish to answer

5. **Please check the category that best describes your racial background:**

   | | |
   |---|---|
   | ○ American Indian | ○ White |
   | ○ Asian | ○ Other |
   | ○ Black or African American | ○ More than one race |
   | ○ Native Hawaiian | ○ I do not wish to answer |

6. **Current income level $/year)?** *Please circle one.*

   | | | | | |
   |---|---|---|---|---|
   | 10,000 or less | 10,000 to 25,000 | 25,000 to 50,000 | 50,000 to 100,000 | 100,000 or more |

7. **Compared to others your age, how would you rate your overall memory?**

   ○ Excellant ○ Good ○ Average ○ Fair ○ Poor

8. **Compared to others your age, how would you rate your overall health?**

   ○ Excellant ○ Good ○ Average ○ Fair ○ Poor

**9. Which of the following best describe your living situation?** *Please check all that apply.*

- ○ Living by myself
- ○ Living with my spouse or partner
- ○ Living with family
- ○ Living with a friend
- ○ Living in a nursing home
- ○ Living in an apartment that is in a retirement community
- ○ Living in an Assisted Living Facility
- ○ Other (please specify):_____

**10. If you want to do something special, how often does someone else want to do it with you?**

○ Almost Always ○ Usually ○ Sometimes ○ Not usually ○ Almost never

**11. Do you feel safe at home?**

○ Almost Always ○ Usually ○ Sometimes ○ Not usually ○ Almost never

**12. How important to you is YOUR MEMORY?**

○ Could not be more important ○ Very important ○ Somewhat important ○ Slightly important ○ Not at all important

# LUBBEN SOCIAL NETWORK SCALE - 6

***FAMILY*** *Considering the people to whom you are related either by birth or marriage…*

1. How many relatives do you see or hear from at least once a month?
0 = none 1 = one 2 = two 3 = three or four 4 = five thru eight 5 = nine or more

2. How many relatives do you feel at ease with that you can talk about private matters?
0 = none 1 = one 2 = two 3 = three or four 4 = five thru eight 5 = nine or more

3. How many relatives do you feel close to such that you could call on them for help?
0 = none 1 = one 2 = two 3 = three or four 4 = five thru eight 5 = nine or more

**FRIENDSHIPS:** *Considering all of your friends including those who live in your neighborhood….*

4. How many of your friends do you see or hear from at least once a month?
0 = none 1 = one 2 = two 3 = three or four 4 = five thru eight 5 = nine or more

5. How many friends do you feel at ease with that you can talk about private matters?
0 = none 1 = one 2 = two 3 = three or four 4 = five thru eight 5 = nine or more

6. How many friends do you feel close to such that you could call on them for help?
0 = none 1 = one 2 = two 3 = three or four 4 = five thru eight 5 = nine or more

# The Satisfaction with Life Scale

By Ed Diener, Ph.D.

DIRECTIONS: Below are five statements with which you may agree or disagree. Using the 1-7 scale below, indicate your agreement with each item by placing the appropriate number in the line preceding that item. Please be open and honest in your responding.

1 = Strongly Disagree
2 = Disagree
3 = Slightly Disagree
4 = Neither Agree or Disagree
5 = Slightly Agree
6 = Agree
7 = Strongly Agree

_____1. In most ways my life is close to my ideal.

_____2. The conditions of my life are excellent.

_____3. I am satisfied with life.

_____4. So far I have gotten the important things I want in life.

_____5. If I could live my life over, I would change almost nothing.

## MARITAL-ADJUSTMENT TEST

1. Check the dot on the scale line below which best describes the degree of happiness, everything considered, of your present marriage. The middle point, "happy," represents the degree of happiness which most people get from marriage, and the scale gradually ranges on one side to those few who are very unhappy in marriage, and on the other, to those few who experience extreme joy or felicity in marriage.

| 0 | 2 | 7 | 15 | 20 | 25 | 35 |
|---|---|---|---|---|---|---|
| * | * | * | * | * | * | * |

Very Unhappy — Happy — Perfectly Happy

State the approximate extent of agreement or disagreement between you and your mate on the following items. Please check each column.

Always Agree = 5
Almost Always Agree = 4
Occasionally Disagree = 3
Frequently Disagree = 2
Almost Always Disgree = 1
Always Disagree = 0

| | | | | | | |
|---|---|---|---|---|---|---|
| 2. Handling family finances | 5 | 4 | 3 | 2 | 1 | 0 |
| 3. Matters of recreation | 5 | 4 | 3 | 2 | 1 | 0 |
| 4. Demonstrations of affection | 5 | 4 | 4 | 2 | 1 | 0 |
| 5. Friends | 5 | 4 | 3 | 2 | 1 | 0 |
| 6. Sex relations | 5 | 4 | 3 | 4 | 1 | 0 |
| 7. Conventionality (right, good, or proper conduct) | 5 | 4 | 3 | 2 | 1 | 0 |
| 8. Philosophy of life | 5 | 4 | 3 | 2 | 1 | 0 |
| 9. Ways of dealing with in-laws | 5 | 4 | 3 | 2 | 1 | 0 |

**Circle the answer below which best describe you:**

10. When disagreements arise, they usually result in:
    Husband giving in; wife giving in; agreement by mutual give and take;

11. Do you and your mate engage in outside interests together?
    All of them; some of them; very few of them; none of them;

12. In leisure time do you generally prefer: to be "on the go" - , to stay at home - ? Does your mate generally prefer: to be "on the go" - , to stay at home- ?

13. Do you ever wish you had not married?
Frequently; occasionally; rarely; never;

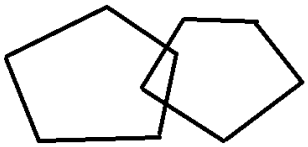
14. If you had your life to live over, do you think you would:
Marry the same person; marry a different person; not marry at all;

15. Do you confide in your mate: almost never;
Rarely; in most things; in everything;

**Mini-Mental State Examination (MMSE)**

Instructions: Ask the questions in the order listed. Score one point for each correct response within each question or activity.

| Maximum Score | Participant's Score | Questions |
|---|---|---|
| 5 | | "What it the year? Season? Date? Day of the week: Month?" |
| 5 | | "Where are we now? County? Town/city? Hospital? Floor?" |
| 3 | | The examiner names three unrelated objects clearly and slowly, then asks the patient to name all three of them. The patient's response is used for scoring. The examiner repeats them until patient learns all of them, if possible. Number of trials:_____ |
| 5 | | "I would like you to count backward from 100 by seven." (93, 86, 79, 72, 65,…) Stop after five answers. Alternative: "Spell WORLD backwards." (D-L-R-O-W) |
| 3 | | "Earlier I told you the names of three things. Can you tell me what those were?" |
| 2 | | Show the participant two simple objects, such as a wristwatch and a pencil, and ask the patient to name then. |
| 1 | | "Repeat the phrase: 'No ifs, ands, or buts.'" |
| 3 | | "Take the paper in your right hand, fold it in half, and put it on the floor." (The examiner gives the participant a piece of blank paper.) |
| 1 | | "Please read this and do what it says." (Written instruction is "Close your eyes.") |
| 1 | | "Make up and write a sentence about anything." (This sentence must contain a noun and a verb.) |

| | | |
|---|---|---|
| 1 | | “Please copy this picture.” (The examiner gives the patient a blank piece of paper and asks him/her to draw the symbol below. All 10 angles must be present and two must intersect.)  |
| 30 | | TOTAL |

# Word List Recall 1 – TIME:

Part 1:
***"Now you will be asked to study and recall a list of 30 words. There will be two phases: a study phase and a recall phase.***

***"During the study phase, you will be given a list a words. You will have 3 minutes to study the list.***

***"During the recall phase, you will try to remember as many words as you can and write them down on the recall sheet. You may take as long as you want and may write the words in any order during the recall phase."***

Hand participant the sheet of words and begin timing. After 3 minutes, take the words and hand participant Recall Sheet 1. Say:

***"Please write the words in the order that you remember them. Do not skip lines, but write a word on each consecutive line until you cannot remember anymore."***

After 3 minutes of writing, ask participant if they need more time.

# Word List Recall 2 – TIME:

Part 2:
***"Now we are going to give you another chance to study the same word list. Again there will be two phases: a study phase and a recall phase. During the study phase, you'll be given the list of wordsand you will have one minute to study the list.***

***"During the recall phase, you will try to remember as many words as you can and write themdown on the recall sheet. You may take as long as you want and may write the words in any order during the recall phase."***

Hand participant the sheet of words and begin timing. After 1 minute, take the word sheet and hand participant Recall Sheet 2. Say:

***"Please write the words in the order that you remember them. Do not skip lines, but write a word on each consecutive line until you cannot remember anymore."***

After 3 minutes of writing, ask participant if they need more time.

| | |
|---|---|
| pansy | daisy |
| steel | tin |
| petunia | elm |
| swimming | carnation |
| cow | lion |
| gold | pine |
| birch | brass |
| golf | football |
| copper | daffodil |
| beech | elephant |
| horse | hockey |
| tennis | pig |
| spruce | soccer |
| tulip | maple |
| bear | aluminum |

# RECALL SHEET – 1

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____
26. _____
27. _____
28. _____
29. _____
30. _____

# RECALL SHEET – 2

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____
26. _____
27. _____
28. _____
29. _____
30. _____

*******AFTER 20 MINUTE DELAY********

## Delayed Word List Recall – 3 – TIME:

Hand participant Recall Sheet 3. Say:

***"Do you remember the word list you memorized a little while ago, please write all of the words in the order that you remember them. Do not skip lines, but write a word on each consecutive line until you cannot remember anymore."***

After 3 minutes of writing, ask participant if they need more time.

# RECALL SHEET – 3

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____
26. _____
27. _____
28. _____
29. _____
30. _____

*Appendix B*

Study Flier

# Men and Women ages 60 years of age or older

You are invited to participate in a research study to better understand memory performance in older adults. At this time, I only need **men of any status** (married, widowed, single, or divorced).

**What do you have to do:** You will spend about 35 - 40 minutes answering questions about your experiences.

**Where:** I will come to a location convenient to you.

**Contact Info:** Phone: 678-643-8163

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This study is part of an MA project for a graduate student in Gerontology at Georgia State University

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