2010

Individual Differences and Memory Aging Concerns of Older Adults

Emily Olinde Boudreaux
Louisiana State University and Agricultural and Mechanical College

INDIVIDUAL DIFFERENCES AND MEMORY AGING CONCERNS OF OLDER ADULTS

A Dissertation

submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy
in
The Department of Psychology

by

Emily Olinde Boudreaux
B.A., Louisiana State University, 2003
M.A., Louisiana State University, 2006
December 2010

ACKNOWLEDGEMENTS

I thank the members of my dissertation committee: Dr. Katie Cherry, Dr. Johnny Matson, Dr. Emily Elliott, Dr. Jason Hicks, Dr. Thompson Davis, Dr. Daphne Cain, Dr. Drew Gouvier, and Dr. Hugh Buckingham. The document is stronger because of their insight and feedback. I am especially grateful to Dr. Katie Cherry for the wisdom and guidance she has tirelessly provided throughout my graduate training. This project would not have been possible without the individuals involved with the Louisiana Healthy Aging Study and the Life Course and Aging Center. I am also grateful to Dr. Johnny Matson, who afforded me with many opportunities for professional growth and development. I must also acknowledge Dr. Dosia Paclawskji for volunteering to provide assistance on this project. Finally, I am thankful for Marisa Sullivan's hard work and help with data.

The support and guidance from my fellow peers should not go unmentioned and will not be forgotten. In particular, Dr. Karri Hawley warmly welcomed me into the program and Dr. Jenny Denver kindheartedly maintained my sanity and sense of humor in creative ways.

Above all, I am thankful to loved ones for their never ending encouragement. To my family, thank you for having faith in me even when I did not. To my husband, thank you for your patience, understanding, and sacrifices made during my graduate training.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

The present research was designed to address two issues with respect to the self-reported memory functioning of older adults. The first issue concerns older adults' practical memory concerns, defined as self-appraisals of one's own memory that include worries, apprehension, and fears about aging that relate to memory. We used a mixed method approach in this study to provide a comprehensive assessment of self-reported memory functioning based on quantitative (the Memory Functioning Questionnaire, the Memory Controllability Inventory) and qualitative (the Practical Memory Concerns survey) indicators. The second issue concerns the contribution of individual difference to older adults' self-perceived memory functioning. The particular individual difference factors that were expected to influence memory aging concerns included: age, presence or absence of family members with Alzheimer's disease as indicated by self report, knowledge of memory aging (indexed by the Knowledge of Memory Aging Questionnaire), cognitive status (indexed by the Mini-Mental State Exam), and affective status (indexed by the Geriatric Depression Scale). Regarding specific memory aging concerns, obligations to others, spatial information, and important dates were most frequently reported as bothersome to forget. Fear of developing disease (e.g. dementia or Alzheimer's disease) and fear of losing independence were the most frequently reported fears of memory aging. Of the individual difference factors expected to influence memory aging concerns, affective status and knowledge of memory aging were significant predictors of memory aging concerns. Age, family history of Alzheimer's disease, and cognitive status were not significantly related to memory aging concerns.

CHAPTER 1: INTRODUCTION

The study of aging has become a worthy and crucial topic of study due in part to the unparalleled demographic trend that the United States is currently facing (Nelson, 2002). The older adult population is presently numbered at 36 million, and that number is predicted to more than double to 77 million by the year 2030 as the Baby Boomers age to older adulthood of age 65 and older (Center for Disease Control and Prevention [CDC], 2009). As the older adult population expands, the percentage of older adults requiring care as well as the number of those providing support to them grows. In 2007, roughly 55% of the older population reported having at least one disease (CDC, 2009). Over a third report having a disease that requires assistance to meet vital personal needs (CDC, 2009).

One of the most frequently reported diseases experienced by older adults is dementia, with Alzheimer's disease (AD) being the most common, affecting 1 in 10 Americans (National Institute of Mental Health [NIMH], 2009). Thus, concerns of the older adult population and their families about aging are becoming increasingly more prevalent and warrant systematic investigation. In particular, memory aging concerns are likely a result of the increasing number of older adults being affected by AD. Zandi (2004) reported that many investigators demonstrated that as many as 23% of older adults reported memory complaints including specific memory deficits as well as affective memory complaints. Memory aging concerns can be thought of as issues individuals report as serious, or worrisome with respect to the likelihood of experiencing life-changing circumstances such as developing AD or losing independence (Zandi, 2004). Memory aging concerns can be operationally defined as worries, apprehensions, and fears about aging that relate to memory. The current study was designed to examine the memory aging concerns of older adults and how individual difference variables contribute.

This paper is organized as follows. First, an overview of AD is given, including family presence of AD. A discussion of normal versus pathological memory aging follows. Next, a general discussion of subjective memory appraisal, including metamemory, is presented. Age and memory aging are discussed subsequently. Then, a review of knowledge of memory aging is provided. A discussion of cognitive and affective status in relation to memory aging concerns concludes the literature review. In the next section, the specific aims of the present research are presented, followed by research methods, results and conclusions, and general discussion.

OVERVIEW OF AD

AD affects as many as 2.4 million to 5.1 million Americans and is the most common form of dementia among people ages 65 and older (National Institute of Mental Health, 2010). One in 10 individuals over the age of 65 and nearly 50% of individuals over the age of 85 are affected (Turkington & Galvin, 2003). The number of Americans diagnosed with AD has more than doubled each decade since the 1960s and that trend is expected to continue well into the middle of this century. The most significant risk factor for AD is age. In particular, the incidence of AD doubles every five years beyond the age of 65 (Bachman, Wolf, et al., 1993). Another risk factor is genetic predisposition. Having a first-degree relative (parent or sibling) with the disease doubles an individual's chance of acquiring it compared to cases with no affected first degree relatives. In addition, three mutations producing familial forms of the disease have been identified including the presenilin-1 gene on chromosome 14, the presenilin-2 gene on chromosome 1, and the amyloid precursor protein on chromosome 21 (Andreason, 2001). The apolipoprotein E gene on chromosome 19 has been identified as a predisposing gene for AD (Andreason, 2001). Given that an astounding number of Americans and their families are affected by AD, early recognition of the symptoms of AD is imperative. Although diagnosis of

AD can only be conclusive by conducting an autopsy, AD diagnosis is made by ruling out other possible causes of memory impairment and deficits in daily life functioning (Turkington & Galvin, 2003).

The progression of AD involves various behavioral and psychological symptoms. In the early stages, people with AD may experience personality changes, mild memory impairment, and have difficulty with instrumental activities of daily living (IADLs; Alzheimer's Association, 2009). With the advancement of the disease, sleep disturbances, delusions, hallucinations, wandering, stubbornness/uncooperativeness, combativeness, apathy or anger, and socially inappropriate behaviors may emerge (Alzheimer's Association, 2009). In the later stages of the disease, activities of daily living (ADLs) such as dressing, bathing and eating refer to activities of daily living and require assistance from others to perform (Alzheimer's Association, 2009).

Impaired memory is the defining characteristic of AD. In the early stages of the disease, short-term memory is impaired in people with AD and becomes increasingly impaired with the progression of the illness (Cherry & Plauche, 1996). For people with early AD, long-term memory also begins to decline, although remote memory may remain intact in the early stages. As the disease advances to the later stages, all types of episodic memory become increasingly severely impaired (Cherry & Plauche, 1996).

NORMAL AND PATHOLOGICAL MEMORY AGING

It is important to distinguish between cognitive deficits that occur as a result of AD (or other ailments) from normal memory aging. Although memory lapses are the defining feature of AD, memory lapses occur in healthy older adults as well. Healthy older adults experience memory lapses that are very different in comparison to the cognitive deficits seen in individuals with AD (Cherry & Plauche, 1996). AD results in the deterioration of cognitive functioning

beginning with lapses in memory, progressing to difficulty with activities of daily living, and ending in eventual loss of all functions and death (NIMH, 2009). Normal memory aging is the result of maturational processes. Declines in memory ability are widespread among the older adult population with decrements revealed in most areas of memory, especially episodic memory and including free and cued recall, time-based prospective memory, and working memory (Neath & Suprenant, 2003). Aspects of memory that are less vulnerable to age-related declines include recognition memory, procedural memory, and implicit memory (Neath & Suprenant, 2003). It is important to separate the normal age-related declines in memory from pathological memory impairments. Forgetfulness is a universal experience for older adults in their everyday life. Nonetheless, lapses of memory may be unusually worrisome for older adults because they may question whether their forgetfulness is indicative of the onset of AD (Reese & Cherry, 2004). Fear of pathological memory aging, chiefly AD, has been shown to negatively influence well-being in middle age adults (Cutler & Hodgson, 2001) and older adults' health status (Centofanti, 1998).

SUBJECTIVE MEMORY APPAISAL AND METAMEMORY

Researchers investigating everyday memory in older adults often rely on self-reports of memory (Reese & Cherry, 2004). Memory self-reports are subjective and vulnerable to various influences. Subjective memory appraisals assess an aspect of metamemory, an individual's knowledge or awareness of memory processes. Metamemory can be described as comprising three components: off-line and on-line evaluations of memory capability and memory performance awareness (Kausler, 1994). Off-line evaluation refers to the ability to evaluate memory proficiency in daily life. On-line evaluation refers to the ability to predict performance on memory tasks. Monitoring refers to the ability to employ effective strategies to be successful

at specific memory tasks. Subjective memory appraisal involves measuring self-evaluations about how memory works and personal beliefs about memory (Cavanaugh & Perlmutter, 1982). Self-reports of memory may involve general memory judgments and task-specific judgments of an individual's memory capabilities (Nelson, 1990; Koriat & Goldstein, 1996). Monitoring effectiveness refers to the extent to which the assessed probabilities successfully differentiate correct from incorrect answers (Koriat & Goldstein, 1996). Control effectiveness refers to the extent to which the volunteering or withholding of answers is actually sensitive to the monitoring output (Koriat & Goldstein, 1996). Because memory changes throughout the lifespan, and results in decreases in overall functioning in old age, studies on metamemory in older adulthood are useful in understanding changes in memory efficiency in older adulthood. It is well documented that people can enhance their memories by using various techniques such as mnemonic devices. Thus, it is possible that older adults may develop and practice various memory aid skills throughout their lifetime so that when their memory starts to decline due to age, they may have little difficulty adapting because they have a set of skills to draw from to help them compensate for their losses. For example, if older adults know that they can remember more items from their grocery list if they group them together in chunks according to categories, they may be more efficient in buying groceries than if they did not have that knowledge (Reese & Cherry, 2004).

Age may influence subjective memory appraisals. Jopp and Hertzog (2007) tested a sample of young, middle, and older adults ages 26 to 83 and found that subjective memory appraisal was negatively correlated with age. In another study, Hine, Touran, and Hertzog (2009) found that there were no age differences in metamemory monitoring. The older adult participants were able to allocate and use study time to encode information as well as the younger adult participants. They also did not demonstrate any differences in controlling memory processes

during task performance. However, one small age difference was found in that older adults overestimated the pace of their responding and generally were unable to accurately estimate their response times (Hine et al., 2009). In another study by Serra, Dunlosky, and Hertzog (2008), confidence in memory monitoring was examined and only slight age differences were found for immediate confidence judgments, and no differences for delayed judgments. The authors concluded that both judgment accuracy and confidence in judgments of learning are not affected by age. Perlmutter (1978) found that both young and old participants were equally able to predict how many words they would recall during both an incidental and an intentional study task. Bruce, Coyne, and Botwinick (1982) found no significant age-related differences for memory monitoring, confidence ratings, accuracy of information concerning memory items, and knowledge about memory strategies. Dixon and Hultsch (1983) conducted a meta-analysis to determine whether there are age-related differences in subjective memory appraisals and found that young adults had significantly more knowledge than older adults about memory tasks in general and about their personal memory capacities. Overall, some researchers have suggested that there are limited changes in self-reports of memory with age, but more research is warranted to examine whether there are adult age differences in metamemory.

Other evidence has shown that depressive symptoms influence subjective memory appraisal. Kahn, Zarit, Hilbert, and Niederehe (1975) did not find high correlations between depressed older adults predicted memory performance and their actual performance on objective memory measures. Bäckman and Forsell (1994) conducted a study comparing healthy older adults and older adults with depression performance on a variety of episodic recall and recognition tasks. They found that depressed older adults require more effortful, elaborate processes at encoding and retrieval in order to perform similarly to the healthy older adults. Also,

the depressed older adults' prediction of their performance on the episodic memory tasks was significantly lower than their actual performance on the tasks. Another study by Dellefield and McDougall (1996) examined the differences in memory performance between a healthy older adult group and a depressed older adult group. Those with depression had significantly lower self-efficacy scores than the healthy older adults; however, there was no difference in memory performance between the depressed and non-depressed. Therefore, depressive symptoms may influence self-appraisals of memory.

Subjective memory concerns and particularly memory complaints are aspects of subjective memory appraisal that are common among older adults. The prevalence of memory complaints among older adults ranges from 23% of older adults (Zandi, 2004) to over 50% (Mol et al., 2005). In addition, concerns about memory typically increase with age (Mol, Ruiter, Verhey, Dijkstra, & Jolles, 2008; Mol, van Boxtel, Willems, & Jolles, 2006; Pearman & Storandt, 2004; Small et al., 2001). The explanation for the increase in memory complaints with age may be self-awareness of memory decline due to dementia (Pearman & Storandt, 2004). Some studies have established an association between memory complaints and cognitive decline, but others have not been able to demonstrate a significant relationship (Mol et al., 2006). In addition, many studies have reported that healthy older adults also complain about memory (Pearman & Storandt, 2004). In conclusion, memory self-appraisals are likely influenced by many different variables and thus individual difference variables must be taken into consideration when making conclusions about older adults' memory appraisals.

AGE AND AD FEARS

Research on the individual differences related to memory aging concerns may help to identify specific characteristics of those more likely to have serious memory aging concerns, such as the fear of developing AD, that negatively impact everyday life. By gaining a better understanding of the individual differences associated with memory aging worries, those at higher risk of memory aging concerns can be targeted for educational programs addressing the differences in normal versus pathological aging or the effects of aging on cognition and quality of life in older adulthood. In-depth knowledge of the aspects of memory that concern older adults could also aid in the development of intervention strategies to improve everyday memory behaviors (Jackson, Cherry, Smitherman, & Hawley, 2008).

Previously, researchers have shown that worry of developing AD is a major threat to the health and well-being of middle aged people, older adults and their families (Cutler & Hodgson, 2001; Centofanti, 1998). Everyday forgetfulness and other cognitive problems are not necessarily indications of the development of AD as discussed previously. Nevertheless, people often link age-related changes in memory functioning as early signs of AD. Because these worries may negatively impact health and well-being, it is worthwhile to test the individual differences that contribute to concerns about memory aging. The older adult population is heterogeneous in regard to many individual difference variables so it is essential to test the contributions of each in research with older adults (Bäckman et al., 1990).

Age-related differences in memory aging concerns were examined in the present study. Age was predicted to play a role in differences in memory concerns. Bäckman et al., (1990) report that because the older adult population is heterogeneous, within the older adult population, comparisons can be made between the oldest old and groups of younger older adults. The oldest

old differs from young old adults in a variety of ways, but in particular are significantly impaired in overall memory function (Bäckman et al., 1990). As a result, they may be more sensitive in recognizing their memory lapses and more likely to worry about them. In addition, it would be expected that as older adults age, they increasingly come into contact with increasing numbers of people diagnosed with AD or other conditions resulting in dementia such as pharmacological or other physiological conditions (stroke, etc.) simply because these conditions increase with age. Because the oldest old typically experience more age-related memory impairment, it was expected that they would be more concerned about memory aging. This population was predicted to worry more about memory aging as they are more personally familiar with disorders resulting in impaired memory functioning like AD and may be more fearful of developing AD.

Presence or absence of family members with AD is another individual difference variable tested as a contributor to memory aging concerns. Individuals who have family members with AD may be more personally familiar with the onset and progression of the disease over others without a family history of AD. Individuals who do not have AD in their family may not be as familiar with the disease and thus not be as concerned with personally developing it. Cutler and Hodgsen (2001) examined concerns with developing AD among middle aged children of older adults diagnosed with AD in comparison to a group of middle aged adults with no parental history of AD. They found that for both groups, worries about memory functioning contributed to worries about developing AD, but the group with parents with AD expressed more concern about developing AD than the comparison group. These findings were expected to be supported in the current study by showing the individuals with family presence of AD report more memory aging concerns than individuals with an absence of AD in their family. One variable not tested in Cutler and Hodgson (2001) study was knowledge of normal aging versus pathological aging. The

current study presented an interesting opportunity to examine the specific contributions of knowledge of memory aging in comparison to the specific contributions of family presence of AD.

MEMORY AGING CONCERNS

Memory aging concerns (worries, apprehensions, and fears about getting older in regard to memory changes), were investigated by responses to specific items of the Memory Functioning Questionnaire (MFQ; Gilewski, Zelinski, & Schaie, 1990), the Memory Controllability Inventory (MCI; Lachman, Bandura, Weaver, & Elliott, 1995), and the Practical Memory Concerns survey (PMC; Reese, Cherry, & Norris, 1999) which are described in detail in the following sections. The MFQ is a standardized measure of self-reported appraisals of memory functioning (Gilewski et al., 1986; Zelinski et al., 1990; Zelinski et al., 1990). It includes four subscales: general frequency of forgetting, seriousness of forgetting, retrospective functioning, and mnemonics usage. In order to focus on memory aging concerns, the present study concentrated on the seriousness of forgetting factor. The seriousness of forgetting factor provides information about what types of things participants find to be serious when they forget and how serious of a problem it is if they forget these things (i.e., names, faces, etc.). If participants deem certain matters as serious, these specific lapses are thought to be worrisome. Seriousness of forgetting implies worries and fears about memory aging in a unique manner that taps into daily life experience.

Previous research has employed the MFQ for varying purposes including examining metamemory to performance on memory tests, testing the influence of individual differences in perceptions of memory functioning, and examining the subjective memory in response to memory training or intervention. Overall, many studies that tested subjective memory

functioning and memory performance also examined the role of individual differences (Brown, Dodrill, Clark, & Zych, 1991; Cook & Marsiske, 2006, etc.). Other studies have applied the MFQ in a practical manner, utilizing it to assess subjective memory in response to various interventions and programs to improve the daily lives of individuals (Floyd & Scogin, 1997; Morey, Cilo, Berry, & Cusick, 2003, etc.).

Objective tests of memory performance, individual differences, and self-reported memory functioning have been examined in many studies that have used the MFQ as a measure of subjective memory functioning among individuals with varying cognitive impairments. For example, Brown, Dodrill, Clark, and Zych (1991) investigated the relationships between self-reported and objective assessments of memory in adults referred for neuropsychological exams due to cognitive dysfunction. Scores on the MFQ were not related to the various memory tests the participants were administered. However, individual differences emerged regarding personality scores. Participants who had elevated scores on a personality test (indicating emotional distress) had perceptions of memory functioning that were related to performance on objective memory tests. In a similar study by Cook and Marsiske (2006), healthy adults and adults with mild cognitive impairment were administered subjective memory measures (MFQ included) and verbal memory tests. A significant relationship between subjective memory functioning and objective memory performance was found for the cognitively impaired group, but not for the control group. The authors concluded that individuals with cognitive impairment have a sensitive awareness of their memory functioning (Cook & Marsiske, 2006). Relationships between subjective memory and objective memory performance has also been compared in adults with traumatic brain injury in a study by Kinsella, Murtaugh, Landry, Homfray, et al., (1996). Traditional memory performance tests as well as prospective memory tasks were

administered to participants in addition to the MFQ. A significant relationship between the prospective memory tasks and the MFQ was the only notable finding (Kinsella et al., 1996). In another study that tested individual differences in older adults regarding performance on memory and general cognitive tasks, Strauss, Bielak, Bunce, Hunter, and Hultsch (2007) tested the relationship between within-person variability to cognitive impairment. Strauss et al. (2007) also examined the role of memory beliefs. Older adults who demonstrated deficits in response speed in multiple domains were more variable in cognitive performance tests and variation was more predictive of cognitive impairment than mean performance speed (Strauss et al., 2007). Differences in memory functioning beliefs (as measured by the MFQ), were not significant (Strauss et al., 2007). Taylor, Miller, and Tinklenburg (1992) also examined the response speed in relation to cognitive decline, but also examined the role of memory complaints of older adults longitudinally over a four year period. Older adults were administered self-reported memory functioning questionnaires (MFQ included) as well as general cognitive tests three times at two-year intervals. Overall, Taylor et al. (1992) found that subjective memory was moderately correlated with longitudinal change in memory only at the individual level. When examining the older adults in groups, self-reports of memory did not change significantly longitudinally (Taylor et al., 1992). A similar study by Zelinski, Gilewski, and Schaie (1995) examined longitudinal memory performance of older adults. More specifically, various individual differences were examined as predictors of memory performance. The MFQ was also used to test whether memory self-appraisals were predictive of memory performance. Reasoning and vocabulary scores, and female gender were predictive of memory performance over a three year period. When the first administration of the memory tests was partialed out, only age and reasoning were

predictive of change in memory performance. Self-reported memory functioning was not a significant predictor of memory performance (Zelinski et al., 1995).

Many studies have used the MFQ to investigate the effects of memory training or intervention on self-reported memory. Floyd and Scogin (1997) conducted a meta-analysis on the effects of memory training, subjective memory performance, and mental health on older adults and found that memory training overall improved subjective memory scores (many studies used the MFQ to assess subjective memory). A study by Morey, Cilo, Berry, and Cusick (2003) tested memory intervention using a memory-enhancing drug and also examined the effects of self-reported memory using the MFQ. Newman, Karip, and Faux (1995) looked at the effects of a school volunteering program on older adults' on everyday memory functioning. The MFQ was used as a tool to test perceptions of everyday memory and found significant changes pre and post volunteering. Other studies have explored memory training programs and subjective memory. Rapp, Brenes, and Marsh (2002) tested the effects of a training program designed to improve the memory of individuals with cognitive impairment. They used the MFQ to test the training program's effects on people's perceptions of their memory in daily life and found that the participants of the memory training program viewed their memory functioning more positively than a control group of individuals that did not participate in the memory training. Verhaeghen, Van Ranst, and Marcoen (1993) conducted a similar study in which they tested the effects of a memory training program on subjective memory. However, they did not find significant changes overall on the MFQ before and after the training program. Woolverton, Scogin, Shackelford, Black, and Duke (2001) examined the effects of a memory training program and found that MFQ scores did not significantly change as a result of the memory training program, but the program overall did improve the objective memory performance of older adults.

In summary, the MFQ has been used to examine metamemory in comparison to objective memory performance, the role of individual differences in perceptions of memory functioning, and subjective memory functioning after memory training program. Overall, researchers provided only limited support for a relationship between self-reports of memory as indexed by the MFQ and objective memory performance. Regarding previous research on the contribution of individual differences to MFQ scores, there is some evidence to suggest cognitive impairment is related to self-reported memory functioning (Cook & Marsiske, 2006; Kinsella et al., 1996). Other studies in which researchers examined the changes in self-reported memory after memory training were conducted using the MFQ and generally self-reports of memory were found to improve after memory training programs (Floyd & Scogin, 1997; Morey et al., 2003; Rapp et al., 2002). See Table 1 for a summary of studies that have used the MFQ.

The MCI assesses beliefs about memory and the controllability of memory (Lachman et al., 1995). It includes four subscales: present ability, potential improvement, effort utility, and inevitable decrement. For the current study, the analyses focused on the inevitable decrement factor. This factor directly addresses concerns with memory decline in old age as well as views on developing AD, a concern of particular interest to the current study. The inevitable decline subscale allows insight into what exactly individuals believe is true about memory decline in older adulthood and provides specific examples of concerns. It was hypothesized that the data on the MFQ and MCI would converge to reveal similar findings on the particular concerns older adults have with memory aging.

Since the introduction of the MCI questionnaire, the MCI has been used as a tool to measure perceived memory ability and perceived control over memory. A sense of control over

memory ability has been shown to influence motivation and memory performance (Lachman, Weaver, Bandura, Elliott, & Lewkowicz, 1992). Individuals with a greater sense of control over memory are more motivated to take advantage of memory aids and to be proactive in using various techniques and strategies to improve memory. Individuals that believe that memory ability is not controllable are not as likely to be motivated to improve their memory. Memory control beliefs have been shown to predict that individuals will use strategies to help memory task performance (Lachman & Andreoletti, 2006). Conversely, individuals who have been conceptualized as having concerns about the effects of aging on problems related to memory, such as worry about memory aging and fears about developing memory-affecting conditions such as AD, are thought to be less motivated to help memory performance and more worried overall about memory aging (Hess, Hinson, & Statham, 2004).

In a study examining older adults' memory fears, Dark-Freudeman, West, and Viverito (2006) compared younger adults and older adults' ratings on the MCI to assess beliefs about memory. They found that the older adults were less confident in their present memory ability as compared to the younger adults. The older adults also had higher ratings of the likelihood of developing AD than the younger adults. Dark-Freudeman et al. (2006) compared MCI scores with spontaneously generated "future selves" in various domains. Older adults were more likely to spontaneously generate cognitive selves, and half reported memory or cognitive concerns. The older adults who reported memory or cognitive concerns reported that memory was the "most dreaded" fear (Dark-Freudeman et al., 2006).

Table 1. Prior Studies Using the Memory Functioning Questionnaire.

Authors	Title	Participants	Measures	Main Findings	MFQ Version: 1986/1990/2004
Brown, Dodrill, Clark, Zych (1991)	An investigation of the relationship between self-report of memory functioning and memory test performance.	62 adults (aged 18–60 yrs) referred for neuropsychological evaluation	MFQ; Minnesota Multiphasic Personality Inventory (MMPI-2); battery of memory tests	MFQ scores not related to memory test scores except for participants with elevated MMPI-2 scores indicating emotional distress	1986
Cherry & Brigman (2005)	Memory failures appraisal in younger and older adults: Role of individual difference and event outcome variables.	Younger adults (M=19.1 years); older adults (M=70.5 years)	MFQ; KMAQ; judgments for vignettes on causes of forgetfulness and memory opinion ratings	Individual differences in self-reported memory (MFQ) had little influence on cause and opinion ratings	1990
Connor, Dunlosky, & Hertzog (1997)	Age-related differences in absolute but not relative metamemory accuracy.	Younger adults (M=20.2 years); older adults (M=71.1 years)	MFQ; Metamemory in Adulthood Questionnaire (MIA); measures of metamemory and recall	MFQ and MIA results not reported; Older and younger adults monitored learning effectively	1990
Cook & Marsiske (2006)	Subjective memory beliefs and cognitive performance in normal and mildly impaired older adults.	Older adults aged 65 and older (healthy controls with mean age of 74.77 years and older adults with Mild Cognitive Impairment with a mean age of 76.94 years)	Subjective memory measures (MFQ and MIA; neuropsychological battery	Subjective memory was significantly related to verbal memory performance in the MCI group and not the healthy group	1990

Table continued

Crane, Bogner, Brown, & Gallo (2007)	The link between depressive symptoms, negative cognitive bias and memory complaints in older adults.	Older adults age 65 and up	Functional status (SF-36); Cognitive status (MMSE, etc.); Psychological status (CES-D, etc.); MFQ	Depressive symptoms significantly related to MFQ	1990
Floyd & Scogin (1997)	Effects of memory training on the subjective memory functioning and mental health of older adults: A meta-analysis.	Older adults age 65 and up	Various related measures	Meta-analysis of memory training found it improved subjective memory performance and mental health, but effect size smaller than the improvements on objective memory measures	only 1990 included in meta-analysis
Gilewski & Zelinski (1986)	Questionnaire assessment of memory complaints.	Adults and older adults	MFQ	original MFQ	original 1986 questionnaire
Gilewski, Zelinski, & Shaie (1990)	The Memory Functioning Questionnaire for assessment of memory complaints in adulthood and old age.	Adults ages 16–89 years	Metamemory Questionnaire(MQ, original MFQ); MFQ	Exploratory factor analysis found 4 factors accounting for 36.7 % of the responses to the MQ so shortened from 92 to 64; high internal consistency	shortened 1990 version
Hertzog, Hultsh, & Dixon (1989)	Evidence for the convergent validity of two self-report metamemory questionnaires.	Younger adults and older adults ages 20-78	Metamemory in Adulthood (MIA; Dixon & Hultsch, 1984); MFQ	Convergent validity for the two metamemory measures; both include a confirmatory factor	1986

Table continued

				labeled memory self-efficacy	
Hertzog, Park, Morrell, & Martin (2000)	Ask and ye shall receive: Behavioural specificity in the accuracy of subjective memory complaints	Adults ages 34–84 years	Cognitive task battery; MFQ; Community Epidemiological Survey of Depression (Radloff, 1977); Medication interview and adherence	Cognitive tasks correlated with MFQ, but not with medication adherence. Depressive affect related to subjective medication adherence but not actual medication adherence or cognitive task performance.	1990
Hertzog, Saylor, Fleece, & Dixon (1994)	Metamemory and aging: Relations between predicted, actual and perceived memory task performance.	Adults ages 18-78 years	Metamemory in Adulthood Instrument; MFQ; memory tasks	Authors state results demonstrate their conceptualization of performance predictions as judgments that are influenced by memory self-efficacy and task appraisal processes. Type of task, age, and task experience influenced prediction accuracy.	1990
Kinsella, Murtagh, Landry, Homfray, et	Everyday memory following traumatic brain injury.	Adults ages 18–63 years, with traumatic brain injury (TBI) as compared to matched	MFQ; battery of recall, recognition, and prospective memory tests	No significant relationships found except a significant correlation between	1990

Table continued

al. (1996)		controls		performance on prospective memory tasks and the Retrospective Functioning scale of the MFQ for TBI patients	
Lane & Zelinski (2003)	Longitudinal hierarchical linear models of the Memory Functioning Questionnaire.	Adults ages 30-81	MFQ; NEO-PI-R personality inventory (Costa & McCrae, 1992); GDS; health rating; list recall; text recall	There were significant mean declines for all MFQ ratings over 19 years except Frequency of Forgetting and significant individual differences in slopes for Frequency, Retrospective Functioning, and Mnemonics. Personality predicted baseline Frequency and Seriousness ratings and list and text recall slopes predicted Mnemonics slopes.	1990
McDonald-Miszczak, Hertzog, & Hultsch (1995)	Stability and accuracy of metamemory in adulthood and aging: A longitudinal analysis.	Sample 1= Adults ages 22–86 years tested twice over 2 years Sample 2= Adults ages 55–86 years tested 3 times over 6 years.	MFQ; MIA	Tested whether perceptions of memory change are due to an implicit theory about aging and memory or from correct monitoring of	1990

Table continued

				true changes in performance. Individual differences in metamemory were stable across testing. Sample 2 experienced actual declines in memory and reported changes. Authors state that overall results support an implicit theory hypothesis.	
Morey, Cilo, Berry, Cusick (2003)	The effect of Aricept® in persons with persistent memory disorder following traumatic brain injury: A pilot study.	Seven TBI patients (aged 19-51 yrs) with persistent memory dysfunction	Neuropsychological battery; MFQ	Significant increases in scores for memory measures but not for MFQ scores	1990
Newman, Karip, & Faux (1995)	Everyday memory function of older adults: The impact of intergenerational school volunteer programs.	Adults over age 60 years	MFQ; Rivermead Behavioral Memory test; GDS	Measures given pre and post a school volunteering program. Found significant differences in scores after program (overall higher scores on both memory measures, no difference in GDS scores)	1986

Table continued

Pedone, Cosenza, & Nigro (2005)	A contribution to the Italian adaptation of the Memory Functioning Questionnaire.	Adults between the ages of 20 and 70.	MFQ	Psychometric properties of the MFQ Italian version; was administered to adults and found to be reliable and valid.	1990
Plude, Benaderet, & Herrmann (2001)	Aging, memory assessment and self-reported function.	Young adults ages 16–27 years; older adults ages 60–87 years	3 computerized memory tasks; MFQ; Memory Readiness Questionnaire (Herrmann)	Young adults better on lists, names, and names-face task than older adults, but not better on object recognition. Years of education and computer use was significant with better memory task scores only for older adults	1990
Potter & Hartman (2006)	Response inhibition and everyday memory complaints in older adult women.	Older adult women (M= 72.9 years of age)	MFQ; executive functioning tests; episodic memory tests; GDS	Stroop test of executive functioning most predictive of memory complaints (MFQ); depression accounted for highest amount of variance in memory complaints	1990
Rapp, Brenes, & Marsh (2002)	Memory enhancement training for older adults with mild cognitive impairment: A preliminary study.	Older adults with mild cognitive impairment (M=73.3 years of age); 10 healthy older adults (M=75.10 years of	MFQ; Memory Controllability Index (MCI); neuropsychological battery; memory recall tests; MMSE; Profile of	Training group had significantly better appraisals of memory (MFQ) after the training than controls; no	1990

Table continued

		age)	Mood States (McNair et al., 1992)	differences between groups for perceived memory control (MCI)	
Reese & Cherry (2006)	Effects of Age and Ability on Self-Reported Memory Functioning and Knowledge of Memory Aging.	Older adults (M= 69.7 years) and younger adults (M=19.6 years)	Working memory measures; measure of verbal ability; recall and recognition memory tests; prospective memory task; Cognitive Failures Questionnaire (Broadbent et al., 1982); MFQ; Knowledge of Memory Questionnaire (Cherry et al., 2000)	Age and ability differences in MFQ scores and knowledge of memory aging (KMAQ). Self-reported memory functioning (MFQ scores) not related to memory performance. KMAQ positively related to memory performance.	1990
Rosen, Prull, Gabrieli, Stoub, O'Hara, Friedman, Yesavage, & deToledo-Morrell (2003)	Differential Associations Between Entorhinal and Hippocampal Volumes and Memory Performance in Older Adults.	Older adults over age 65 years	Wechsler Memory Scale subtests Logical Memory (WMS-LMI) and Paired Associates (WMS-PAI) immediate recall (Wechsler, 1956), the Benton Visual Retention Test—Revised (Benton, 1974), a memory recall test, MRI, neuropsychological screening tests, MFQ	Overall, entorhinal and hippocampal volumes related to individual differences in various types of memory performance in older adults. According to scores on memory tests, participants were divided into high-memory and low-memory groups. Scores on the MFQ did not differ	1990

Table continued

				between the groups.	
Rubio &Portero (2008)	Validation of the reduced Spanish version of the Memory Functioning Quesionnaire (MFQ) in a sample of elderly people over 55 years old.	Adults over the age of 55	MFQ	Psychometric properties of the MFQ Spanish version was administered to adults over the age of 55 and found to be reliable and valid.	2004
Scogin & Rohling (1989)	Cognitive processes, self-reports of memory functioning, and mental health status in older adults.	Older adults ages 60–88 years	Vigilance and mental rotation tasks; Stroop test; tests of memory for word frequency and frequency of color and location of shapes; the Cognitive Failures Questionnaire (CFQ), MFQ, SCL-90 (mental health)	Significant relationships between SCL-90 and both the cognitive tasks and CFQ and MFQ. Participants' assessments of their cognitive and memory functioning were related to lab test scores	1986
Searcy, Bartlett, Memon, & Swanson (2001)	Aging and lineup performance at long retention intervals: Effects of metamemory and context reinstatement.	96 young (18–30 years) and older (62–79 years) adults	MFQ, Benton Face Recognition Test, interviews	False identification of an incorrect target in a lineup was correlated with higher scores the MFQ and higher recall of information about the initial event for older adults	1990
Small, Chen, Como, Ercoli, Miller, Siddarth,	Memory self-appraisal and depressive symptoms in people at genetic risk for	66 persons (aged 43-82 yrs)	HAM-D, APOE-4 test	Depressive symptoms (HAM-D) significantly associated with	1990

Table continued

Kaplan, Dorsey, Lavretsky, Saxena, & Bookheimer (2001)	Alzheimer's disease.			subjective memory loss (MFQ); for retrospective memory loss and mnemonics usage, that relationship only true for those who are not APOE-4 carriers	
Smith, Peterson, Ivnik, Malec, & Tangalos (1996)	Subjective memory complaints, psychological distress, and longitudinal change in objective memory performance.	294 55-97-year olds	MFQ (general frequency of forgetting scale); Symptom Checklist-90—Revised General Severity Index (GSI), and Mayo Cognitive Factor Scales Learning and Retention (MCFS-LRN and MCFS-RET)	GSI and MCFS-LRN current score contributed 20% and 3%, to the variance of MFQ-GEN. Authors state that emotional status was a better predictor of subjective memory than objective memory performance or objective longitudinal memory change.	1990
Strauss, Bielak, Bunce, Hunter, & Hultsch (2007)	Within-person variability in response speed as an indicator of cognitive impairment in older adults.	304 older adults ages 64-92 (M= 74.02 years) all divided into 5 groups according to cognitive status	Neuropsychological battery and MFQ	Within-person variability in response speed was studied. Results showed that people with multiple domains of impairment showed more variability than those with just one	1990

Table continued

				area of impairment (especially in situations with high cognitive load).	
Taylor, Miller, &Tinklenberg (1992)	Correlates of memory decline: A 4-year longitudinal study of older adults with memory complaints.	30 older adults (ages 60-85)	Three tests of the WAIS (Wechsler, 1955): the Arithmetic, Digit Symbol, and Block Design tests, a 12-word recall task; MFQ; MMSE; HAM-D; Brief Cognitive Rating Scale	Participants tested 3 times at 2 year intervals: found significant decrease in word recall scores and self-reported memory decline (MFQ)	1990
Verhaeghen, Van Ranst, & Marcoen (1993)	Memory training in the community: Evaluations by participants and effects on metamemory.	129 participants (M=63 years of age)	MFQ used as pre-posttest measure; participants used in memory training program	No differences in pre and posttest of MFQ except significant increase in frequency of forgetting subscale scores	1986 version translated into Dutch
Woolverton, Scogin, Shackelford, Black, & Duke (2001)	Problem-targeted memory training for older adults.	77 older adults (aged 60-88 years)	2 Memory training programs with memory measures;MFQ; Positive and Negative Affect Scale (PANAS)	Both memory training programs produced improvements in various memory outcome measures; PANAS scores correlated with MFQ scores; pre and posttest MFQ scores did not change	1990
Zelinski & Gilewski (2004)	A 10-item Rasch modeled memory self-efficacy scale	565 people ages 30-97 (M=67)	MFQ; NEO-PI-R personality inventory (Costa & McCrae,	Female gender, conscientiousness score, depression	1990

Table continued

			1992); GDS; health rating; list recall; text recall	score, and list recall predicted individual differences in participants' scores on the shortened 10—item MFQ	
Zelinski, Gilewski, & Anthony-Bergstone (1990)	Memory Functioning Questionnaire: Concurrent validity with memory performance and self-reported memory failures.	Study 1:198 adults aged 55–85; Study 2 :89 adults aged 50–87	MFQ; battery of lab memory tests (Randt memory test); MMSE; GDS; diaries of memory failures	With depression, education, and health were partialed out, MFQ scores predicted performance on lab memory tests in Study 1 and performance on clinical memory tests and diaries of memory failures for 2 weeks in Study 2.	1986 version in press at the time of publication
Zelinski, Gilewski, & Schaie (1993)	Individual differences in cross-sectional and 3-year longitudinal memory performance across the adult life span.	508 subjects aged 55–84 from the initial test and, of these, 227 longitudinal subjects (ages 55-84)	Memory recall tests; MFQ; battery of cognitive tasks (visual rotation task, vocabulary, etc.)	Memory self-appraisal (MFQ) was not predictive of memory performance; overall-those with declines could be predicted by age or reasoning scores	1990

In a similar study, Jopp and Hertzog (2007) used the MCI to examine the relationship between activities, memory beliefs, and cognitive performance. Using a lifespan sample of participants, they found that the cognitive ability was significantly related to engagement in various activities including developmental activities, experiential activities, social activities, physical activities, technology use, watching television, games, and crafts. They also found that predicting cognitive ability by activity level was mediated by memory beliefs. Age, education, health, and depression were controlled for. Jopp and Hertzog (2007) reported that memory beliefs (particularly control over memory ability) may help motivate individuals to engage in various activities.

Other studies have used the MCI to help examine aging stereotypes on memory (Hess, Hinson, & Statham, 2004; Hess & Hinson, 2006). Hess et al. (2004) found overall that both implicit and explicit aging stereotype primes influenced older adults' memory performance and did not influence the younger adults' memory performance. In this study, the MCI was employed as a measure of memory-related beliefs and found that stereotype priming did not affect memory beliefs. Hess and Hinson (2006) found that aging stereotypes affected the memory performance of middle-aged and younger older adults, but not the youngest or oldest participants. They also found that beliefs about memory aging (as determined by MCI scores) were affected by aging stereotypes. Positive aging stereotypes were related to higher memory controllability beliefs and negative aging stereotypes were related to lower memory controllability beliefs.

Finally, the MCI has been used as a measure to help test perceived control over memory in relation to performance on various cognitive and memory tasks. Rapp, Brenes, and Marsh (2002) tested the effectiveness of a memory training program for individuals with mild cognitive impairment. The MCI was compared to memory performance both before and after the training

program, but scores did not change. Stine-Morrow, Milinder, Pullara, and Herman (2001) examined aspects of reading performance in younger and older adults. The MCI was used to test memory controllability as related to memory performance, but it was not found to be correlated. For a summary of studies that have used the MCI, see Table 2.

Participants also provided individualized memory aging concerns using the PMC survey, which permitted a more thorough and detailed account of personal memory aging concerns than the MFQ and MCI. Although the MFQ and MCI subscales supplied valuable quantitative data on memory aging concerns, open-ended questions allow for more of an in-depth, rich, descriptive investigation of memory aging concerns. Reese, Cherry, and Norris (1999) developed the PMC to obtain qualitative data on the everyday memory concerns of individuals. The PMC in its original form consisted of 7 open-ended questions that tap four areas of memory functioning: memory self-efficacy, memory management, memory remediation, and fears about memory loss. In its current form, the PMC includes 9 open-ended questions covering the topics of memory self-efficacy, memory management, memory remediation, and fears about memory aging in older adulthood (Reese et al., 1999). This survey was chosen particularly for the memory fears factor, which represents the apprehensions about the ways that memory loss can affect psychological well-being and quality of life. One question of the memory management factor is also of noteworthy interest to this study: the "forgetting that is bothersome" questions. The PMC question about bothersome forgetting asks participants what lapses in memory are bothersome, which allows for direct comparison to the seriousness of forgetting subscale of the MFQ. Participants' responses to the PMC questions should yield in-depth information regarding self-reported memory concerns in old age. Cherry et al. (2004) conducted a study to examine the practical memory concerns of older adults and found that when older adults were asked to

Table 2. Prior Studies Using the Memory Controllability Index.				
Authors	Title	Participants	Other Measures	Main Findings
Dark-Freudeman, West, & Viverido (2006)	Future Selves and Aging: Older Adults' Memory Fears.	Younger adults ages 18-33; Older adults ages 57-87	MCI; Aging Concerns Scale; Health Values Scale	Cognitive and memory "future selves" examined and found half of the older adult participants had memory or cognition concerns.
Hess & Hinson (2006)	Age-related variation in the influences of aging stereotypes on memory in adulthood.	Younger adults ages 24 and over; older adults 85 years of age	Metamemory in Adulthood Questionnaire; Aging Concerns Scale; Stait Trait Anxiety Survey	Reading stereotypical negative information about aging and memory affected various age groups differently on recall memory performance. The stereotypical information affected beliefs about aging and memory as well.
Hess, Hinson, & Statham (2004)	Explicit and Implicit Stereotype Activation Effects on Memory: Do Age and Awareness Moderate the Impact of Priming?	Younger adults ages 18-29; older adults ages 65 and over	MCI; SF-36 Health Survey; Metamemory in Adulthood Questionnaire; various cognitive performance tasks; State Trait Anxiety Inventory Wechsler Adult Intelligence Scale	Implicit and explicit aging stereotype primes had significant affects on older adults' memory performance and did not affect younger adults' memory performance.
Jopp & Hertzog (2007).	Activities, self-referent memory beliefs, and cognitive performance: Evidence for direct and mediated relations.	Lifespan sample of adults ages 18-over 65	Personal Beliefs About Memory Inventory-Specific Memory Ability Scale and Present Control Scale; MCI:	In a lifespan sample, activities (including social, physical, etc.) were related to memory beliefs and cognitive performance.

Table continued

			Present Ability Scale and Effort Utility Scale; and battery of cognitive tests including vocabulary, working memory tasks, etc.	When controlling for age, education, health, and depressive affect, prediction of cognition by activity level was partially mediated by memory beliefs.
Lachman, Waltham, Bandura, Weaver, & Elliott (1995)	Assessing memory control beliefs: The Memory Controllability Inventory	140 adults ages 65–85; 209 adults ages 55–86; and 162 adults ages 20–90	Aging Concerns, age, sex, yrs of education, and self-rated health.	MCI subscales had consistent factor structure and fair internal consistency reliabilities for the subscales. Age and health were correlated with MCI.
Rapp, Brenes, & Marsh (2002)	Memory enhancement training for older adults with mild cognitive impairment: A preliminary study.	Older adults with mild cognitive impairment (M=73.3 years of age); 10 healthy older adults (M=75.10 years of age)	MFQ; Memory Controllability Index (MCI); neuropsychological battery; memory recall tests; MMSE; Profile of Mood States	Training group had significantly better appraisals of memory (MFQ) after the training than controls; no differences between groups for perceived memory control (MCI)
Stine-Morrow, Milinder, Pullara, & Herman (2001)	Patterns of resource allocation are reliable among younger and older readers.	Younger adults ages 18-39; Older adults 58-85	MCI; various cognitive measures (working memory measures, processing speed, etc.)	Older and younger adults did not differ in reading memory performance, but patterns of resource allocation did. Memory controllability was not related to reading performance.

report their fears about aging, the most frequently reported fear was the loss of independence and the second most commonly reported fear was developing a memory impairing disease (Reese et al., 1999; Reese & Cherry, 2004). While memory performance does decline with age, not all declines are pathological. Thus, although pathological memory aging concerns of older adults are warranted (Craik & Jennings, 1992; Zacks, Hasher, & Li, 2000), it is important to examine possible contributing factors to these concerns. Specific comparisons can be made between the memory fears question of the PMC survey and the inevitable decline subscale of the MCI. It was hypothesized that the PMC responses would correspond with the reported memory aging concerns revealed by the standardized measures.

KNOWLEDGE OF MEMORY AGING

Investigating the knowledge individuals have about memory aging is worthwhile in examining whether it plays a role in contributing to memory aging concerns. The KMAQ (Cherry, et al., 2000) assess laypersons' knowledge of normal and pathological memory aging changes throughout older adulthood. Half of the questions address normal memory changes that occur in later life and the other half pertain to abnormal memory deficits that are due to non-normative factors, such as physiological or psychopathological conditions, pharmacological agents, and/or adult dementia or AD. The normal memory aging questions represent a broad range of topics drawn from the cognitive aging literature (e.g., memory organization/systems, episodic memory phenomenon, encoding/retrieval factors, mnemonics/memory strategies, and individual difference and contextual influences on memory). The pathological memory aging questions include a large range of topics as well (e.g., types of abnormal deficits, identification of abnormal deficits, mental health conditions affecting memory, physical health conditions affecting memory, and adult dementia/AD).

Many studies have used the KMAQ to assess knowledge of memory aging in students and older adults (Cherry, Brigman, Hawley, & Reese, 2003; Reese, Cherry, & Copeland, 2000; Reese & Cherry, 2006), very old adults (Hawley, Cherry, Su, Chiu, & Jazwinski 2006), police officers (Hawley, Garrity, & Cherry, 2005), college students and mental health professionals (Jackson, Cherry, Smitherman, & Hawley, 2008), and students, caregivers, and senior service providers (Cherry, Allen, Boudreaux, Robichaux, & Hawley, 2009). The Hawley et al. (2006) study is particularly relevant to the current study as it is the only published study to date that has employed very old adults (80+ years). In their study, memory knowledge was compared in middle aged adults (40-59 years), young-old adults (60-79 years), and very old adults (80 years and older). The very old adults were the least knowledgeable about memory aging and also endorsed false views of normal memory aging based on stereotypes more often than the other two groups. Hawley et al.'s (2006) results inform predictions for the current study in that based on the findings, it would be expected as older adults age, knowledge of memory aging decreases.

The Jackson et al. (2008) and Cherry et al. (2009) studies both included students as well as individuals with regular direct contact with older adults (mental health professionals, and caregivers and senior service providers, respectively). In both studies, the researchers found the groups with direct contact with older adults to be more knowledgeable about memory aging than the students. Their findings reveal that the more everyday experience individuals have with older adults, the more knowledgeable they are on the subject of memory aging. In addition, the Jackson et al. (2008) study found that the students and the mental health professionals improved on both their normal and pathological memory aging knowledge scores after listening to a lecture on memory aging. These findings indicate the KMAQ is sensitive to instruction. Taken together, these findings also inform predictions for the current study. Specifically, the participants in the

present study are a diverse sample compared to the Jackson et al. (2008) and Cherry et al. (2009) samples. Many of these individuals have frequent direct contact with older adults in their daily lives. Because the participants are older adults themselves, it was expected that the people with whom they come into contact the most frequently are their peers (such as their friends, family members, neighbors, and coworkers). In light of the reviewed research, it was expected that as a result of the many of the participants' frequent contact with older adults, some would be more accurate in their knowledge of memory aging. As a result, it was predicted that the participants with more memory aging knowledge will be more alert to the differences between normal memory aging and pathological memory aging in their own lives and would not be as concerned with memory lapses that occur in everyday life associated with normal memory aging.

COGNITIVE STATUS

Participants' cognitive status is another individual difference variable that potentially contributes to differences in memory aging concerns. If older adults are experiencing memory lapses, individual differences in cognitive status may be responsible. Lopez, Becker, and Sweet (2002) have demonstrated that individuals exhibiting characteristics of cognitive impairment more often exhibit psychological distress. Slight deficits in cognitive functioning may contribute to memory aging worries and fears. Deficits in overall cognitive status are commonly measured using the Mini-Mental Status Exam (MMSE; Folstein, Folstein, and McHugh, 1975) MMSE, which is a widely used measure of global cognitive functioning for screening purposes in social and behavioral research. One aspect of the MMSE that should be given special consideration is the delayed recall portion in which participants are asked to recall three words (i.e. cup, pencil, airplane) after a time delay in which they engaged in active processing of subtracting by 7 s and spelling the word, "world" backwards. Previous research has shown that poor recall of the words

was a better predictor of eventual development of dementia than the overall composite score of the MMSE (Loewenstein, Barker, Harwood, Luis, Acevedo, Rodriguez, & Duara, 2000). For the present study, this information is meaningful because it provides a clearer understanding of the discrepancies between those with higher and lower levels of cognitive functioning as well as relational value to family history of AD. It was predicted that individuals scoring lower on the MMSE would express more memory aging concerns than individuals with higher cognitive status due to personal experience with possible memory impairment. In examining the MMSE in more detail, it was also predicted that individuals who remember fewer delayed recall words would express more memory aging concerns than individuals who are able to recall all of the delayed recall words.

AFFECTIVE STATUS

Similarly, research consistently supports that affective status influences memory aging concerns. Older adults with depression complain more about memory problems than their healthy aged counterparts whether or not actual memory performance is impaired (Bäckman & Forsell, 1994). Individual differences in affect, and in particular depressive symptoms, negatively impact self-reports of memory (complaints, fears, worries, etc.) and possibly memory performance as well (Kahn, Zarit, Hilbert, & Niederehe, 1975). The Geriatric Depression Scale (GDS) is widely used as a screener for affective status in the elderly population. Individuals with higher scores on the GDS (demonstrating signs depressive symptoms) were expected to express more memory aging concerns than individuals not demonstrating signs of depressive symptoms.

SPECIFIC AIMS

The purpose of the present study was to provide new evidence on the memory aging concerns of older adults and individual difference variables that may contribute to their concerns.

This is important because the older adult population is rapidly growing as a result of the Baby Boomer generation. Consequently, there will continue to be more individuals living past their 90th birthdays. A good understanding of the specific memory aging concerns of the oldest-old provides unique and valuable information about a rare demographic group growing in number. In addition, information about the memory concerns of older adults and the factors that influence their concerns can be used to develop interventions and educational programs to aid in reducing any anxiety, apprehensions, or fears about memory related to aging.

The first goal of this study was to examine specific memory aging concerns of older adults using the MFQ, the MCI, and the PMC. The second goal of the current study was to examine the contribution of various individual differences including age, familial presence or absence of AD, memory aging knowledge, cognitive status, and affective status on memory aging concerns. Data from the MFQ, MCI, and PMC survey comprise the operational definition of the construct memory aging concerns. Specific, serious lapses of memory are represented in the MFQ, and fears of memory decline are represented in the MCI; both are represented in the PMC survey. Taken together, a range of memory aging concerns is accounted for. The present study utilizes archival data from a sample of participants drawn from the Louisiana Healthy Aging Study, a multidisciplinary population-based study that examines the determinants of healthy aging in adulthood.

Regarding specific predictions, first, it was hypothesized that age would be correlated with MMSE, KMAQ, MFQ, and MCI data. Specifically, it was expected that with age, declines in general cognitive status would be observed, consistent with many prior studies on cognitive aging (Craik et al., 1992; Zacks et al., 2000). It was also predicted that with increasing age, scores will decrease on the KMAQ as previous research has suggested those over age 80 scored

less accurately on the measure than younger older adult groups (Hawley et al., 2006). Age was also expected to be significantly correlated with memory aging concerns. This prediction was supported by the logic that as older adults age, they are more likely to encounter individuals with memory-impairing conditions and worry about their own health as a result of the encounters (Centofanti, 1998; Centofanti, 1998). Also, as older adults age, they are more likely to notice their own increasing lapses in memory (Cavanough et al., 1983; Gilewski & Zelinski, 1986). In regard to presence or absence of a family history of AD, it was hypothesized that this variable will be correlated with the MFQ and MCI for similar reasons. Those with a history of AD in their family were expected to be more likely to be aware of their own memory lapses in daily life and worry that these lapses may be pathological. In regard to the relationship between family history of AD and knowledge of memory aging, it was hypothesized that those with a family history of AD would be more active in seeking out knowledge on memory aging. Thus, it was expected they would perform better on the KMAQ. In regard to the KMAQ data, it was hypothesized that as knowledge of memory aging increases, memory concerns as indexed by the MCI and MFQ would decrease. The KMAQ was predicted to be negatively correlated with the MFQ and MCI data because the individuals were hypothesized to be able to differentiate the differences between normal and pathological memory aging in their daily lives and not be as concerned with everyday lapses in memory. This prediction was partly motivated by the hypothesis that the more daily life experience individuals have with older adults, the more knowledgeable they become about memory aging (Cherry et al., 2009; Jackson et al., 2008). In regard to cognitive and affective status, it was hypothesized that both will be correlated with MFQ, and MCI data. Those scoring lower on the MMSE (indicating poor cognitive functioning) and those scoring higher on the GDS (indicating more depressive symptoms) were expected to

be more worried and fearful about memory aging. This prediction was based on previous studies that documented both sets of individuals exhibit increased levels of psychological distress (Bäckman et al., 1994; Lopez et al., 2002), which was predicted to extend to general worry and fear about memory aging.

In regard to the PMC data, fear of developing AD and fear of losing independence were expected to be the most frequently reported fears on the fears of memory aging question in line with previous findings (Reese et al., 1999; Reese & Cherry, 2004), which would correspond with MCI data. As for the most bothersome forgetting, the findings of the current study are predicted to replicate the previous findings (Reese et al., 1999; Reese et al., 2004) in which names were found as the most commonly reported bothersome information to forget, which was also predicted to correspond with the MFQ data. New and unique bothersome forgetting and memory aging fears answers were expected to be found, allowing for a more in-depth knowledge of memory aging concerns. The PMC data were predicted to align with the MFQ and MCI data.

CHAPTER 2: METHOD

PARTICIPANTS

A total of 101 older adults with a mean age of 83.53 years (SD =10.02) participated in the current study. Included in the following section are a summary of how participants were recruited and a detailed description of the participants. This project is based on archival data collected between February 2005 and August 2008. Participants were sampled from the Louisiana Healthy Aging Study (LHAS), a multidisciplinary study of the oldest-old. The primary goal of the LHAS was to investigate the factors associated with healthy aging using numerous physiological and psychological measures. LHAS is a collaborative effort among researchers from Louisiana State University (LSU) in Baton Rouge, LSU Health Sciences Center in New Orleans, Pennington Biomedical Research Center (PBRC) in Baton Rouge, the University of Pittsburgh, and the University of Alabama at Birmingham. Participants were randomly sampled through voter registration lists and the Center for Medicare and Medicaid Services files by personnel in the School of Public Health at the LSU Health Sciences Center in New Orleans. All participants lived within a 40-mile radius of the PBRC in Baton Rouge, LA. LHAS participation information was mailed to potential participants with a self-addressed, stamped envelope and postcard for the individuals to return to signify interest in participating. Individuals that returned the postcards were telephoned and scheduled for a pre-visit where informed consent was obtained. During PBRC follow-up visits, medical and psychological screening questionnaires were administered. For those over age 70 years of age, the screening questionnaires were administered in a home visit. After the screening visit was completed, a day-long testing session was held at the PBRC in which participants were individually administered various measures of physical health and cognitive performance. Evidence of neurological impairment resulted in

exclusion from the study. Any participants also had the right to withdraw from the study at any time for whatever reason without penalty. Although participants were asked to disclose personal identifying information (demographic data, etc.) all participants were assigned a 5-digit identification number in order to allow personal identifying information to be kept separate from their responses to the measures. All participants in this study were compensated a minimum of $150 for their voluntary participation and were paid in increasing increments according to levels of participation. For the LHAS initial visit and follow-up PBRC visit, the payment increments included $50 for blood draw only, $150 for participating in some of the projects, and $300 for participating in all of the projects. For the current study, the payment increments included an additional $20 for each additional participation day, with a maximum possible payment of $360.

For the current study, the participants were drawn from LHAS study and agreed to participate in an additional study on memory (Project 5). Participants also were required to score a 25 or higher on the MMSE at initial testing to exclude individuals with indications of significant dementia. These individuals were drawn from a total of 869 individuals that participated in the screening process for LHAS. Of those, 369 individuals participated in the follow-up PRBC visit which included more extensive cognitive testing, and of those, a total of 101 individuals between the ages of 60 and 94 years participated in the current study. See Figure 1 for a flow chart of participation. See Appendix A and B for a copy of the demographic questionnaires. Appendix A is the demographic questionnaire administered during the initial screening and Appendix B is the demographic questionnaire administered during the PO1 follow-up visit.

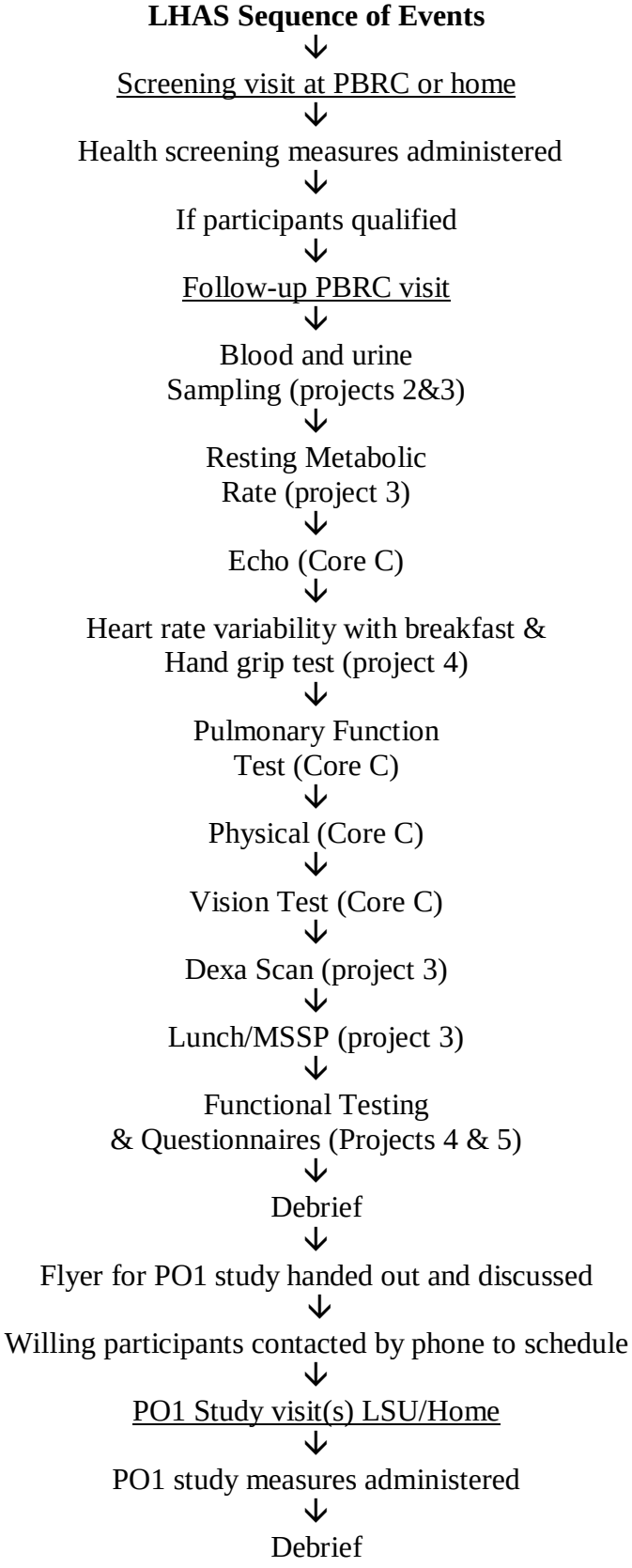

Figure 1. Flow Chart of Participation

The demographic information collected for the initial LHAS screening visit included age, race, marital status, educational attainment, occupational status, self-reported health information, and social support information (see Appendix A). The demographic information collected for the current study included self-reported health information, social support information, and information about family history of AD by asking participants to report whether they had any relatives diagnosed with AD, and if so, to indicate how this person (or these persons) were related to the participants (see Appendix B). In order to determine if there was a selection bias regarding the participants of the current study in comparison to the overall LHAS study sample, independent-samples t-tests and chi-square tests of independence were conducted to compare the educational attainment, marital status, health information, social support information, MMSE scores, and GDS scores of the LHAS overall sample to the sample of the current study. A two-way chi-square test of independence was used to examine the relationship between marital status for the LHAS overall sample and the sample of the current study. There was a significant difference in marital status (1= never married, 2 = married, 3 = divorced or separated, 4 = widowed) between the LHAS sample and the current sample, χ^2 (1, n = 99) = 19.61, p <.01. A significant difference was also found in overall self-reported health status (1 = excellent, 2 = good, 3 = fair, 4 = poor) between the LHAS sample and the current sample, χ^2 (1, n = 98) = 22.48, p <.01. No other differences between groups were found.

Participants of the current study included a total of 101 older adults with a mean age of 83.53 years (*SD* =10.02). In order to determine if any age differences were significant between groups of the current sample on the demographic information collected, independent-samples t-tests were conducted to compare the young-old (ages 60-89 years) to oldest-old (ages 90-94 years). A significant difference in MMSE scores between the young-old (M = 28.35, SD = 1.28)

and the oldest-old (M = 27.15, SD = 1.63) was also found. No other differences between groups were found. See Tables 3, 4, and 5 for summaries of the demographic information of the participants.

Table 3. Demographic Characteristics of the Sample.		
Variable	n=101	Mean (SD) or Percent of Population
Initial PBRC Screening Demographic Questionnaire		
Age		83.53 (10.02)
Race	Black American Indian Other White	00.60 00.10 00.50 98.88
Sex	Male Female	44.00 56.00
Self-reported health	Excellent Good Fair Poor	26.26 58.60 14.13 01.01
Health troubles	Not at all A little (some) A Great deal	44.89 40.00 15.11
Health compared to peers	Better Same Worse	77.78 21.21 01.01
Number nights in the hospital as a patient during the past year	None 1 to 3 4 to 6 Over 6	74.75 11.11 07.07 07.07
Marital Status	Never Married Married Divorced or Separated Widowed	04.00 36.00 05.00 55.00
Educational Attainment	Less than 7^{th} grade 7^{th}-9^{th} grade 10^{th}-11^{th} grade High School graduate Partial College/Special training College or University graduate Graduate Degree	01.00 05.00 01.00 21.00 31.00 28.00 13.00
Number of clubs or social activities belong to	None 1 to 3 4 to 6	07.07 63.64 21.21

Table continued

	Over 6	08.08
Hours per week spent outside the home	None 3 to 5 6 to 12 13 to 19 Over 19	02.02 23.23 33.33 14.14 27.27
Satisfied with overall support from others for dealing with problems	Very satisfied Fairly satisfied A little satisfied Not satisfied at all	77.78 21.21 01.01 00.00
Confidant	No Yes	15.00 85.00
PO1 Follow-Up Demographic Questionnaire		
Health at present time	Excellent Good Fair Poor	31.68 50.50 15.84 01.98
Health troubles	Not at all A little (some) A great deal	43.56 40.59 15.84
Health compared to peers	Better Same Worse	82.00 16.00 02.00
Health changed	No Yes	70.30 29.70
Change in medications	No Yes	64.36 35.64
Life changes	No Yes	90.10 09.90
Number of social organizations	None 1 to 3 4 to 6 Over 6	00.99 54.46 25.74 18.81
Hours outside home per week	None 3 to 5 6 to 12 13 to 19 Over 19	01.98 16.83 27.72 16.83 36.63
Support from others	Very satisfied Fairly satisfied Not satisfied	79.21 17.82 02.97
Confidant	No Yes	10.89 89.11
Family history of AD	No Yes	69.00 31.00

Table 4. Individual Difference Characteristics of the Sample.		
	Young-old adults (n = 51)	Oldest-old adults (n = 50)
	M (SD)	*M (SD)*
Age	75.82 (1.08)	91.00 (1.08)
MMSE[a]	28.35 (1.28)	27.15 (1.63)
GDS[b]	1.29 (1.55)	2.18 (1.98)
Notes. [a]Mini-Mental State Exam (Folstein, Folstein, & McHugh, 1975). [b]Geriatric Depression Scale (Sheikh & Yesavage, 1986).		

Table 5. Education, Marital Status and Self-Reported Health		
	Young-old adults	Oldest-old adults
	Percent of Population	
Years of Education		
At most high school	27.45	30.00
Partial college or training	29.41	30.00
College degree	29.41	26.00
Graduate degree	13.73	14.00
Marital status		
Never married	5.88	2.00
Married	49.02	22.00
Divorced or separated	7.84	2.00
Widowed	1.96	76.00
Health at the present time		
Excellent	35.29	28.00
Good	43.14	58.00
Fair	19.61	12.00
Poor	1.96	2.00
Health prevents activities		
Not at all	43.14	44.00
A little/some	39.22	42.00
A great deal	17.65	14.00
Health compared to others		

Table continued

	Better than	76.47	86.00
	The same as	23.53	8.00
	Worse	0.00	4.00

MATERIALS

Memory Functioning Questionnaire

The MFQ is a standardized measure of self-reported everyday memory functioning. It includes four factors: general frequency of forgetting, seriousness of forgetting, retrospective functioning, and mnemonics usage. There are many advantages to using this particular measure because it has been tested with a large number of older adults and has been examined for its psychometric properties. Gilewski et al. (1990) and Zelinski, Gilewski, and Anthony-Bergstone (1990) have demonstrated that the MFQ possesses high internal consistency and reliability, as well as adequate concurrent validity with other measures of memory. The internal consistency of the questionnaire has been tested and the Cronbach alphas for the scale ranged from 0.82 to 0.93 (Gilewski et al., 1990). Test-retest reliability of the scales over a three year period ranged from 0.22 to 0.64 (Gilewski et al., 1990). Participants rate items on a 7-point Likert scale. For the current study, a shorter version of the seriousness of forgetting subscale was used which was based on Zelinski and Gilewsi (2004)'s revision of the MFQ. The seriousness of forgetting factor subscale was deemed most relevant to the current study because it denotes self-reported concerns related to forgetting. See Appendix F for a copy of the MFQ.

Additional follow-up studies on the original MFQ have tested its psychometric properties. First, Zelinski, Gilewski, and Anthony-Bergstone (1990) examined the predictive value of the MFQ on laboratory memory tests as well as diaries of memory failures. Authors reported that the MFQ has moderate concurrent validity with memory tests (Zelinski et al., 1990). Zelinski and Gilewski (2004) examined responses to the MFQ for 565 participants and

using Rasch scaling, determined that a set of 10 items provided similar scoring patterns among individuals. Thus, a shortened 10-item version of the MFQ was created and was found to be reliable and have similar construct validity to the longer version of the MFQ (Zelinski et al., 2004). It is an adapted and revised version of the MFQ developed from the frequency of forgetting scale of the MFQ. Female gender, consciousness, depression, age, education, and neuroticism were all variables that reliably correlated with scores on the measure. Overall, the MFQ has solid psychometric properties and is an accepted widespread measure of memory functioning (Zelinski et al., 2004). The MFQ has even been translated into many different languages and used worldwide including Spain, the Netherlands, and Italy (Pedone, Cosenza, & Nigro, 2005; Rubio & Portello, 2008; Verhaeghen, van Randst, & Marcoen, 1993). See Appendix F for a copy of the MFQ.

The Memory Controllability Inventory

The MCI (Lachman et al., 1995) is a 19-item measure that assesses beliefs about memory and the controllability of memory. It includes four subscales: present ability, potential improvement, effort utility, and inevitable decrement. It has been shown to have a reliable factor structure and moderate internal consistency reliability (Lachman et al., 1995). Internal consistency for the four subscales is 0.72, 0.77, 0.54, and 0.71, respectively (Lachman et al., 1995). Factor structure revealed four clear factors, with effort utility showing the most variance, most likely due to a wide range of mnemonics and aids mentioned. In regard to validity, the MCI has concurrent validity with similar memory questionnaires including the Metamemory in Adulthood (MIA) measure and the Memory Self-Efficacy Questionnaire (MSEQ; Lachman et al., 1995). Participants rate items on a 7-point Likert scale. For the present study, the inevitable decrement factor was the subscale most relevant to the current study for its contribution to

memory controllability related to memory decline. The inevitable decline subscale includes items numbered 1, 4, and 19. The other subscale item numbers include 2, 8, and 12 for the present ability subscale; 3, 10, and 17 for potential improvement; and 7, 9, and 14 for effort utility. See Appendix G for a copy of the MCI.

The Practical Memory Concerns Survey

The PMC (Reese et al., 1999) is a survey with open-ended questions that included four areas of everyday memory functioning including memory self-efficacy, memory management, memory remediation, and fears about memory aging. Questions are qualitatively analyzed for personalized responses. For the present study, the focus was on one question in the memory management area involving bothersome forgetting and one question in the fears about memory aging involving fears about memory loss.

Knowledge of Memory Aging Questionnaire

The KMAQ contains 28 items in a true, false, or don't know format measuring knowledge of normal and pathological memory aging (Cherry, et al., 2003). Half of the questions address knowledge of normal memory changes that occur in later life as a result of maturational processes and the other half address knowledge of pathological memory changes that may be due to non-normative factors that affect memory functioning in older adults (such as AD). Prior research on the psychometric properties of the KMAQ have demonstrated convergent and discriminant validity using the using the Facts on Aging Quiz, the Facts on Aging and Mental Health Quiz, and the Alzheimer's Disease Knowledge Test (Cherry, West, Reese, Santa Maria, & Yassuda, 2000). The original version of the measure included only true and false questions and the internal consistency reliability was reported as 0.55 (Cherry et al., 2000). Follow up studies including a "don't know" (DK) response option (Cherry, Hawley, Brigman, & Reese,

2003) computed Cronbach's alphas again and found adequate internal consistency reliability (0.76), which is likely due to larger sample sizes and greater instrument sensitivity with the addition of the DK response option (Cherry et al., 2009). Consequently, for the current study, the KMAQ with a DK option was employed in the proposed research. See Appendix E for a copy of the KMAQ.

Mini-Mental State Exam

The MMSE (MMSE; Folstein, Folstein, and McHugh, 1975) is a brief measure of cognitive status that was used to assess current cognitive status in all participants. The MMSE provides specific aspects of cognitive functioning including orientation to time and place, registration of words, attention and calculation, recall of words, verbal language and direction comprehension, and visual construction. The MMSE has been tested with thousands of older adults, is brief, and its psychometric properties have been widely tested. Tombaugh and McIntyre (1992) reviewed studies reporting on the psychometric properties of the MMSE over the last 26 years and found the internal consistency to range from poor to excellent (Cronbach alphas from 0.54 to 0.96), but found that most studies reported at least adequate internal consistency. Twenty-four out of the 30 studies reported excellent test-retest reliability ($r > 0.75$; Tombaugh & McIntyre, 1992). Generally, Tombaugh and McIntyre (1992) found the MMSE have high concurrent validity with various dementia scales and higher reliability in cognitively impaired populations over healthy older adults. The scores range from 0-30 with 30 reflecting a perfect score. Older adults with healthy cognitive functioning average 28.4 on the MMSE (Benson, Slavin, Tran et al., 2005) and individuals with mild cognitive impairment (possible preclinical dementia or AD) demonstrate an average score of 24 (Petersen et al., 1999). Dementia or other cognitive impairments may be implicated with scores lower than 25 (Folstein,

Folstein, & McHugh, 1975). A score of 30 in comparison to a score of 25 is deemed a considerable difference in cognitive functioning. The MMSE total scores and delayed recall scores for all participants were examined in order to provide further discrimination of cognitive status. Delayed recall scores are used in addition to overall MMSE scores in comparing family history of AD and memory aging fears (in particular fear of developing AD). For the present study, individuals were included if they scored a 25 or higher on the MMSE.

It is important to note that proper administration of the MMSE is essential in producing accurate scores. Watkins, Gouvier, Gallen, and Barkenmeyer (1989) examined the various factors that influence MMSE scores. They found that in various populations tested including healthy individuals, individuals with dementia, and at-risk individuals, the serial subtraction item is significantly more challenging than the alternative item involving spelling the word, "world" backwards. MMSE administrators for the current study were trained by a psychologist with extensive experience in both administration of the MMSE and research involving the MMSE in order to provide the most accurate assessment. All administrators were trained to follow the administration guidelines outlined in Folstein et al. (1975). See Appendix C for a copy of the MMSE.

Geriatric Depression Scale

The GDS (GDS; Sheikh & Yesavage, 1986) was administered as the measure of affective status for the current study. It is a screening measure of depression in older adults. The full-length version of the GDS has 30 items and the short form has 15. The short form was administered for its brevity and also because it has been reported to have good reliability (Cronbach alpha of 0.81) and concurrent validity with other depression scales in screening for depressive symptoms (Sheikh et al., 1986). Each question involves a yes or no answer and a

score of 1 is given to yes responses. Scores of 5 or less may indicate no clinically significant depressive symptoms, scores of 5 to 10 may be indicative of mild depressive symptoms, and scores of over 10 may indicate clinically significant symptoms of depression (Sheikh et al., 1986). See Appendix D for a copy of the GDS.

PROCEDURE

Most of the measures collected for this study were administered as part of the LHAS follow-up memory study between 2005 and 2008, with the exception of the KMAQ, which was administered during the screening phase. The remainder of the measures were administered over the course of two days. The administration of the measures took place at Dr. Katie Cherry's lab on the LSU campus for individuals under the age of 80, and at the homes of the individuals over the age of 80 (if requested). During the first session, rapport was established and informed consent was obtained. Then, the MMSE, GDS, and demographic information were administered. Other measures for other portions of Project 5 were administered as well including the forward and backward digit span tasks, the size judgment span task, and the MIDI personality questionnaire. At the end of the first day, participants were given a copy of the PMC questions to take home and look over. They were briefly explained and any questions they had about the PMC were answered. The second session occurred approximately two days later. During the second day, the PMC questions, MFQ, and MCI were administered. Three other open-ended questions on older adulthood were administered for another portion of project 5 as well. All open-ended questions were tape-recorded for later transcription. At the end of the second day, participants were debriefed and any questions participants had were answered. Each session took approximately 2 hours each to complete.

STATISTICAL CONSIDERATIONS

In order to verify that the present sample size allowed for sufficient statistical power, a power analysis was conducted. Based on a power analysis computed using G-Power, a series of possible sample sizes with a range of possible effect sizes was calculated (Faul & Erdfelder, 2007). Correlational analyses were conducted to examine the relationships between age, family history of AD, knowledge of memory aging on memory aging concerns (KMAQ), memory aging concerns (MFQ and MCI), cognitive status (MMSE), and affective status (GDS). Regression analyses were conducted in order to determine if there were any significant predictor variables for the memory aging concern measures (MFQ and MCI) among the individual difference variables (age, family history of AD, KMAQ, MMSE, MMSE delayed recall, and GDS). Regression analyses were run separately, once using MFQ as the dependent measure, and once using the MCI as the dependent measure. The maximum number of predictor variables was 6, and thus the power analysis was conducted with largest number possible. Given a large effect size ($f = 0.32$), an $\alpha = 0.05$, a $\beta = 0.80$, and 6 predictor variables, the total sample needed would be 49 participants. With a medium effect size ($f = 0.15$), and the other perimeters remaining constant, the total sample needed would be 99. Finally, with a small effect size ($f = 0.02$), the total sample needed would be 698. The current sample size of 101 participants permits sufficient power, given a medium effect size.

CHAPTER 3: RESULTS

DEPENDENT MEASURES

Memory Functioning Questionnaire

MFQ was scored according to the standard procedures advised for this measure. It is a 7-point Likert scale with lower scores indicating more serious memory concerns related to memory functioning. Means for each subscale are reported in Table 6. An examination of the individual items of the MFQ seriousness of forgetting subscale indicated that names were most frequently reported as serious (*M* = 3.35, *SD* = 1.25), followed by beginning to do something and forgetting what was started (*M* = 4.71, *SD* = 1.26), followed by where you put things (*M* = 4.79, *SD* = 1.72), followed by directions to places (*M* = 4.68, SD = 1.50), and lastly faces (*M* = 5.15, *SD* = 1.25).

Table 6. Mean MFQ Ratings.

Subscale	M	SD
Frequency	4.81	0.78
Seriousness	4.77	1.22
Retrospective	3.43	0.93
Mnemonics	3.30	1.17

Memory Controllability Inventory

The MCI was scored according to the standard procedure advised for this measure. All items were rated on a 7-point Likert scale with higher scores indicating beliefs of less control over memory, and thus more memory aging concerns. Means for each subscale are reported in Table 7. An examination of the individual items of the MCI inevitable decline subscale (items numbered 1, 4, and 9) indicated that the highest rating of inevitable decrement was for the item phrased, “whatever I do, my memory is bound to get worse” (*M* = 4.06, *SD* = 1.86), followed by the item phrased, “there is no way I can make up for the losses that come with age” (*M* = 3.64,

SD = 1.67), and lastly the item phrased, “there is not much I can do to keep my memory from going downhill” (*M* = 3.30, *SD* = 1.84).

Table 7. Mean MCI Ratings.

Subscale	M	SD
Present	5.13	1.19
Potential	3.77	0.85
Effort	5.29	1.02
Inevitable	3.67	1.31

Practical Memory Concerns Survey

The PMC responses to the question about bothersome forgetting and the question about memory aging fears comprised the qualitative data representing memory aging concerns. Data analysis for the PMC questions was kept separate from the MFQ and MCI data analysis for the most part, except when comparisons between quantitative and qualitative data could be made. Only two out of the nine PMC questions were coded for analysis in this study. Qualitative data analysis of the PMC questions was analyzed following a similar protocol and coding scheme first conducted by Reese et al. (1999). The Reese et al. (1999) coding scheme included 9-16 general descriptors for each PMC question in order to categorize responses. Two independent raters categorized the participants' responses according to the code. Interrater reliability was calculated as the number of agreements between the two raters divided by the total number of agreements plus disagreements multiplied by 100 (Nunnally & Bernstein, 1994). The interrater reliability of the judges' classifications of the Reese et al. (1999) study was acceptable (80.1%).

Participants’ responses to the open-ended PMC questions were tape-recorded by the interviewer as well as manually recorded on paper. Tapes from each interview were then transcribed and audited (a research assistant listened to the tape while reading the typed

transcription). The transcriptions were coded using the coding scheme first developed for the Reese et al. (1999) study, but the codes were tailored to suit the current study. In order to pilot the coding scheme a randomly selected common set of transcriptions (approximately 25% of transcriptions) were selected to be coded using the Reese et al. (1999) coding scheme by graduate and undergraduate students. For the current study, two independent judges: two psychology graduate students, as well as psychology undergraduates were trained to categorize each of the participants' responses as falling under one of the descriptive categories. If no responses fell into a particular category, that category was excluded from analysis. This streamlined the number of categories used and eliminated infrequent categories a priori. Based on the outcomes of coding the common set, a final key was developed and used to code all of the PMC transcriptions for the two questions of interest to the current study.

The bothersome forgetting question (question 5 of the PMC) is stated: "Think about the different things or kinds of information that you tend to forget in your day to day life. Please focus on things that you may forget, where forgetting bothers or upsets you. Please describe the things that you might forget and why you are bothered by forgetting them." The coding scheme for this question in the Reese et al. (1999) study included 18 categories incorporating important dates, names, prospective memory tasks, etc. An example of a response to this question is "Remembering people's names. I guess the thing that really bothers me the most is forgetting people's names. I'll be somewhere and I'll be like, I know that guy or I know that lady, but I don't remember where or what their name is, stuff like that. Or somebody will walk up to you and call you by name and you have no idea who it is, that gets me sometimes."

The fears about memory loss question (question 7a of the PMC) is stated: "Think about the different aspects of memory aging that are the most frightening to you. Please describe your

greatest fears about memory aging as you move through the adult years." Reese et al. (1999) included 12 coding categories for this question which included succumbing to disease, loss of independence, becoming a burden on family and friends, etc. The following is an example of a response to the PMC memory aging question for a participant 91 years of age."Well, out of all the things I've lost my mind is the one that I miss the most. [laughs] But, like, my mother is in the nursing home with Alzheimer's and the thing that is frightening to me is that I might end up like her. And her memory, she has no memory what so ever. Except, she babbles instead of talks and if she talks if you can understand sometimes, she will talk about things that happened before she got married. And her and my daddy is celebrating 79 years this year, if he was still living. But I have no idea who she is talking about because I wasn't around then. But I think that is what gets me the most, is that she that I might end up like her. I try to remember to do things that make my mind work a little bit more so it doesn't get to that stage. Like I'll sit down, I have a little computer game, Tetris, and you have to remember which way the blocks go, things like this. My son plays solitaire. And Free Cell you have to use your mind a little bit, have you ever played Free Cell? But that helps me remember things. Keep my mind active." Appendix H includes examples of responses for the coding categories for both PMC questions.

In order to achieve consistency and reliability of the coding scheme, the following protocol based on Anfara, Brown, and Magione (2002) was also implemented. Once the coding categories were confirmed, two psychology graduate students, as well as three psychology undergraduates coded each transcription independently. After scoring subsets of transcriptions, the coders met and discussed coding for each protocol. Any discrepancies between the individuals coding decisions were discussed at length until a mutual agreement was met. As a

result, a 100% inter-rater reliability was achieved because a consensus was made for each transcription.

In order to convert the qualitative data into a quantitative form, a frequency count was calculated for each coding category per PMC question and participant. A proportion score was then calculated for each participant and question. For each coding category, the occurrence of each category was divided by the total number of occurrences across categories. Proportion scores were calculated in order to be able to compare overall totals that were unequal in the frequency of responses per question across questions and across individuals. See Appendix H for examples of responses.

Participants were asked to report the types of forgetting that are most bothersome in PMC question 5. A proportion score for each of the categories for all participants overall is displayed in Table 8. Participants indicated that forgetting obligations or commitments to others as the type of forgetting that is most bothersome. Forgetting spatial information (e.g., where keys are located) and important dates were also commonly reported as bothersome. Interestingly, the fourth most commonly reported response was that individuals overall were not bothered by forgetting (i.e., no bothersome forgetting). Forgetting names and forgetting to return phones calls, e-mails, or letters were also reported as bothersome.

Table 8. PMC Bothersome Forgetting Proportion Scores Overall.

Category	No. of Responses	Proportion Scores
Obligations/commitments to others	34	0.16
Spatial location information	29	0.13
Important dates	28	0.13
Reported no bothersome forgetting	26	0.12
Names of people	16	0.07
To return phone calls, reply to email or letters	16	0.07
Other	15	0.07
To pay bills	8	0.04
Other future action	7	0.03

Table continued

To do household chores	7	0.03
To take medications	7	0.03
Verbatim information	7	0.03
Faces	3	0.01
Skill-based activities	3	0.01
To engage in a leisure activity	3	0.01
Semantic information	2	0.01
Temporal orientation information	2	0.01
Content information	1	0.01
Distinctive episodic events from childhood	1	0.01
General School/Job information	1	0.01
Important numbers	1	0.01
Run an errand	1	0.00

Participants' responses were also divided into age groups in order to compare any differences between the responses of the young old (ages 60-89, n = 50) and oldest old (ages 90+, n= 51). Proportion scores for each age group are presented in Table 9. Overall, the top four categories remained the same for both groups as the overall participant proportion totals, but the most frequently reported categories changed for both groups. In addition, the young old differed from the oldest old in the categories most commonly reported. For the young adults, forgetting spatial information was the most bothersome, followed by obligations/commitments to others, and important dates. One central difference between age groups is that the most commonly reported category for the oldest old adults was that they were not bothered by forgetting. Obligations/commitments to others and important dates were the second most commonly reported types of bothersome forgetting for the oldest old, and forgetting spatial location information was the fourth most commonly reported category of bothersome forgetting.

Table 9. PMC Bothersome Forgetting Proportion Scores by Age.				
Category	No. of Responses		Proportion Scores	
	Young old	Oldest old	Young old	Oldest old
Obligations/commitments to others	18	16	0.17	0.15
Spatial location information	19	10	0.17	0.09
Important dates	12	16	0.11	0.15
Reported no bothersome forgetting	9	17	0.08	0.16
Names of people	8	8	0.07	0.07
To return phone calls, reply to email or letters	8	8	0.07	0.07
Other	5	8	0.06	0.07
To pay bills	7	3	0.05	0.03
Other future action	5	2	0.05	0.02
To do household chores	4	3	0.04	0.03
To take medications	5	2	0.04	0.02
Verbatim information	3	4	0.03	0.04
Faces	2	1	0.02	0.01
Skill-based activities	0	3	0.00	0.03
To engage in a leisure activity	1	2	0.01	0.02
Semantic information	1	1	0.01	0.01
Temporal orientation information	0	2	0.00	0.02
Content information	0	1	0.00	0.01
Distinctive episodic events from childhood	1	0	0.01	0.00
General School/Job information	0	0	0.01	0.00
Important numbers	0	1	0.00	0.01
Run an errand	0	1	0.00	0.01

In order to examine differences between the participants with a reported family history of AD in comparison to the participants with no reported family history of AD, participants' proportions were divided into two groups. However, it is important to note that the groups were unequal in size. Seventy participants reported that they did not have a family history of AD, and 31 reported they did. The type of forgetting most commonly reported for both groups was obligations/commitments to others, but forgetting important dates was equally as bothersome for the group without a family history of AD. Forgetting spatial information was the second most commonly reported type of bothersome forgetting for both groups. One interesting difference

between the groups is that the individuals without a family history of AD reported slightly more frequently that forgetting is not bothersome than the individuals with a family history of AD. Proportion scores for each group are presented in Table 10.

Table 10. PMC Bothersome Forgetting Proportion Scores by Family History of AD.

Category	No. of Responses		Proportion Scores	
	No AD	AD	No AD	AD
Obligations/commitments to others	24	10	0.15	0.19
Spatial location information	21	8	0.13	0.15
Important dates	24	4	0.15	0.07
Reported no bothersome forgetting	20	6	0.12	0.11
Names of people	8	8	0.05	0.15
To return phone calls, reply to email or letters	11	5	0.07	0.01
Other	12	3	0.07	0.06
To pay bills	5	3	0.03	0.06
Other future action	6	1	0.04	0.02
To do household chores	5	2	0.03	0.04
To take medications	7	0	0.04	0.00
Verbatim information	6	1	0.04	0.02
Faces	3	0	0.02	0.00
Skill-based activities	3	0	0.02	0.00
To engage in a leisure activity	3	0	0.02	0.00
Semantic information	0	2	0.00	0.04
Temporal orientation information	2	0	0.01	0.00
Content information	1	0	0.01	0.00
Distinctive episodic events from childhood	0	1	0.00	0.02
General School/Job information	1	0	0.01	0.00
Important numbers	1	0	0.01	0.00
Run an errand	1	0	0.01	0.00

Because many participants reported they were not bothered by forgetting, a further investigation of the absence of bothersome forgetting was made. Out of the 26 participants who reported that they were not bothered by forgetting, 14 did not respond with any other types of bothersome forgetting. A total of 12 participants reported that they were not bothered by forgetting, but also acknowledged types of bothersome forgetting. Taken together, this suggests

that some participants were simply not bothered by forgetting, and others acknowledged they were bothered by forgetting at times, but overall did not find lapses in memory concerning. The following is an example response from a participant who reported not being bothered, but also acknowledged types of bothersome forgetting: “Not really. It doesn’t really bother me. I just kind of think that is funny. It does kind of bother me if I lose my purse like I did here the other day.”Another example is as follows: “ It would have to be something minor because I just do not let things worry me. You would go crazy if you did. I try to be happy each day God gives me and if I forget anything in the world it would be to call one of my neighbors. It does aggravate me when I do that.” Basically, for the participants who reported not being bothered by forgetting, but also reported types of bothersome forgetting, occasionally being bothered by forgetting was not important to them. Lapses in memory did not significantly impact their thoughts or daily life, and thus they did not particularly place any value on lapses in memory. Conversely, there were 14 participants who reported that forgetting did not bother them at all and did not report any types of bothersome forgetting. An example of a response from one of these participants is as follows: “Yeah, I don’t. It doesn’t bother me at all. Sometimes it’s an embarrassment. But I don’t… I don’t know. It may seem weird, but I just don’t really have any problems in the day to day activities types of things.” Another example response is as follows: “I kind of let it go. It really doesn’t bother or upset me. Not that much. I don’t get upset very easily.” There are two likely rationales for the phenomenon that some participants reported not being bothered by forgetting at all: that the participants had no problems remembering or did not care to acknowledge problems remembering.

To further investigate the two possible rationales, an in-depth examination was conducted of the 14 participants who did not report any types of bothersome forgetting using the

participants' relevant additional data. First, the participants' MMSE scores were examined in order to obtain information about the participants' cognitive status. Researchers previously have shown that cognitive impairment influences insight (Vogel, Stokholm, Gade, Andersen, Hejil, Waldemar, 2004). The researchers found that insight into memory problems is related to level of impairment, but individuals with even very mild impairment or no impairment may lack insight into memory ability. Overall, the 14 participants had an average score of 27.57 (ranging from 25 to 30) on the MMSE as compared to 27.92 for the entire current study sample. Cognitive status for the 14 participants did not differ substantially from the rest of the participants, but the trend in the data suggests that as individuals decline in cognitive functioning, a lack of insight may be possible. Second, the 14 participants' scores on the MFQ and MCI were considered for further comparisons of the seriousness of forgetting as well as memory control and inevitable decline. For the MFQ seriousness of forgetting subscale, the 14 participants had a higher average (M = 5.29, SD = 1.13) than the entire sample (M = 4.77, SD = 1.22), indicating they reported forgetting was less serious. The participants that reported they were not bothered by forgetting also reported forgetting was less serious. The 14 participants' responses to the MCI inevitable decline subscale (M = 3.64, SD 1.53) did not differ considerably from the entire sample (M = 3.67, SD = 1.31). The participants who reported they were not bothered by forgetting had overall neutral responses to feelings of control over memory decline.

Participants were asked to report their fears associated with memory aging for the second targeted PMC question. A proportion score for each category overall for all participants is displayed in Table 11. The two most commonly reported fears of memory aging were the fear of succumbing to disease (e.g. dementia or AD) and the fear of losing one's independence. The third most commonly reported response was that individuals overall were not fearful of memory

aging (i.e. a no memory aging fears). Participants also reported a fear of becoming a burden on others or not knowing friends and family members.

Table 11. PMC Fears of Memory Aging Proportion Scores Overall.

Category	No. of Responses	Proportion Scores
Succumbing to disease	43	0.23
Loss of independence	43	0.23
Reported no fears	28	0.15
Becoming a burden on others	23	0.12
Other	20	0.10
Not knowing friends or family	16	0.08
Forgetting a skill	7	0.04
Losing self	7	0.04
Constraints on social interactions	3	0.02
Being repetitive	1	0.01

Participants' responses for the fears of memory aging question were also divided into age groups for comparison. For the young old, the most commonly reported fears were succumbing to disease, loss of independence, and becoming a burden on others. For the oldest old, an interesting finding similar to the bothersome forgetting question was that following loss of independence, the second most commonly reported fear was an absence of fear. It appears that a trend emerged in which the oldest old group reported that memory aging is not concerning to them. Proportion scores for the participants divided by age groups are presented in Table 12.

Table 12. PMC Fears of Memory Aging Proportion Scores by Age.

Category	No. of Responses		Proportion Scores	
	Young old	Oldest old	Young old	Oldest old
Succumbing to disease	28	15	0.28	0.16
Loss of independence	18	25	0.18	0.27
Reported no fears	10	18	0.10	0.20
Becoming a burden on others	13	10	0.13	0.11
Other	11	9	0.11	0.10
Not knowing friends or family	9	7	0.09	0.08
Forgetting a skill	4	3	0.04	0.03
Losing self	3	4	0.03	0.04
Constraints on social interactions	2	1	0.02	0.01
Being repetitive	1	0	0.01	0.00

Participants' responses were separated into the participants' absence or presence of AD in their family history in order to examine differences between the groups. Overall, the participants with an absence of AD in their family most commonly reported the fears of loss of independence, followed by succumbing to disease. The participants with a family history of AD most commonly reported succumbing to disease followed by loss of independence. An examination of the proportion scores indicated that the participants without a presence of AD also were slightly more likely to report that they did not have memory aging fears. Proportion scores for the participants divided by group are presented in Table 13.

Table 13. PMC Fears of Memory Aging Proportion Scores by Family History of AD.

Category	No. of Responses		Proportion Scores	
	No AD	AD	No AD	AD
Succumbing to disease	30	13	0.22	0.25
Loss of independence	32	11	0.23	0.21
Reported no fears	21	7	0.15	0.14
Becoming a burden on others	18	5	0.13	0.09
Other	12	8	0.09	0.15
Not knowing friends or family	12	4	0.09	0.08
Forgetting a skill	5	2	0.03	0.04
Losing self	6	1	0.04	0.02
Constraints on social interactions	2	1	0.01	0.02
Being repetitive	1	0	0.01	0.00

Because so many participants reported that they were not fearful of memory aging, a further examination of the responses was made. Out of the 28 participants who reported they did not have fears of memory aging, only 8 acknowledged some memory aging fears. An example of one of the 8 that acknowledged memory aging fears is as follows: "I do not have any fears whatsoever in this world about aging. I just hope and pray and the only thing I care about is God letting me go and not have to be a burden on my two children, I fear. My son has been fighting

cancer for about 14 years." The participants who acknowledged memory aging fears, but also reported they were not fearful, generally recognized there are some aspects of memory aging that can be fearful, but the fears do not have a significant impact on their thoughts for the future or their daily life. Twenty out of the 28 indicated as their only response that they were not fearful of memory aging. An example response of a participant with no fears is as follows: "No it doesn't bother me. I said if it happens, it'll happen and there is nothing I can do to stop it. So I don't worry about the things I can't control." Overall, some participants reported they were not fearful of memory aging and others reported they were generally not fearful of memory aging, but acknowledged some fears.

In order to further investigate the 20 participants who reported solely that they had no fears of memory aging, an examination of the participants' other relevant data was made. First, an examination of the participants' family history of AD was made with the expectation that individuals with no reported family history of AD would be more likely to report not being fearful of memory aging. However, out of the 20 participants, 6 reported a family presence of AD. Second, the 20 participants' scores on the MFQ and MCI were taken into consideration in order to make comparisons to the seriousness of forgetting subscale as well as memory control and inevitable decline subscale. For the MFQ seriousness of forgetting subscale, the 20 participants had a slightly higher average (M = 5.00, SD = 1.26) than the entire sample (M = 4.77, SD = 1.22) the 20 participants, indicating they reported forgetting was not as serious. The 20 participants' responses to the MCI inevitable decline subscale (M = 3.84, SD = 1.38) were only slightly higher than the entire sample (M = 3.67, SD = 1.31). The participants who reported they were not bothered by forgetting reported fairly neutral feelings of control over memory decline.

Knowledge of Memory Aging Question

The KMAQ was scored by calculating proportion scores for each participant on the basis of the number of normal memory aging items and pathological memory aging items answered correctly. The number of don't know responses was subtracted from the total number of normal or pathological memory aging items and divided the resulting value by the number of correct responses. Means appear in Table 14.

Table 14. Mean Proportion Correct Scores for KMAQ.

Question Type/DK option	*M*	*SD*
Total Correct	0.67	0.14
Normal	0.63	0.17
DK Normal	0.11	0.1
Pathological	0.71	0.16
DK Pathological	0.15	0.16

Mini Mental Status Exam

The MMSE was administered as a measure of global cognitive status twice, once at the initial screening and then again at the PO1 follow-up visit. The scores were not significantly different from the first administration (M = 27.92, SD = 1.52) to the second (M = 27.92, SD = 1.84). Delayed word recall was scored for the second administration with a maximum score of 3 (M = 2.12, SD = 0.95).

Geriatric Depression Scale

The GDS was given as a measure of affective status. A score of 6 or higher indicates mild depressive symptoms and only 2.97% of the participants had a score of 6 or higher. The remainder of the participants did not endorse clinically significant depressive symptoms (M = 1.37, SD = 1.67).

RELATIONSHIPS AMONG RESPONSES TO DEPENDENT MEASURES

In order to draw conclusions about the general construct of memory aging, responses to dependent measures were compared for consistency in responding and comparisons among varying aspects of the construct of memory aging represented by the dependent measures. The MFQ represented the memory functioning aspect of memory aging concerns, the MCI the memory controllability aspect of memory aging concerns, and PMC bothersome or fearful aspects of memory aging concerns. Rapp et al. (2002) was the only other study besides the present study known to administer both the MFQ and MCI. The subscales were organized by Rapp et al. (2002) into categories including perceived memory ability (MFQ frequency of forgetting and retrospective functioning, MCI present ability subscales), perceived impact of memory functioning (MFQ seriousness and mnemonic use subscales), and perceived control over memory (MCI potential improvement, inevitable decline, and effort utility subscales). The categories were utilized in order to draw conclusions between self-reported memory appraisals of memory function and control before and after participating in a memory enhancement training program. However, Rapp et al. (2002) did not make comparisons across the subscales within the categories. The same categories used by Rapp et al. (2002) were applied to the MFQ and MCI data for the current study, but an examination across the subscales within the categories was made to make comparisons between the MFQ and MCI. Responses to the PMC questions were also included in the comparisons when relevant comparisons were able to be made. See Table 15 for correlation data for MFQ and MCI comparisons.

Regarding the perceived memory ability category, all three subscales were significantly related to each other with medium to strong correlations between the variables (MFQ frequency

of forgetting and MCI present ability subscales: $r = 0.52$; MFQ frequency of forgetting and MFQ retrospective memory subscales: $r = 0.41$; MFQ retrospective memory and MCI present ability subscales: $r = 0.32$). Overall, these findings suggest that participants of the current study reported that their perceptions of their memory functioning for the present and the past are similar. Rapp et al. (2002) grouped the subscales together, but did not report relationships between the variables so no comparisons can be made between the current study and the results of the Rapp et al. (2002) study.

For the impact of memory functioning category, comparisons were made between the MFQ seriousness of forgetting and MFQ mnemonics subscales as suggested by Rapp et al. (2002), but the two subscales were not significantly correlated. This indicates that participants' perceptions of the seriousness of their forgetting were not related to mnemonic use. In other words, the individuals who regarded forgetting as serious (indicating worry and concerns about lapses in memory) were not more likely to report using techniques such as appointment books or lists to try to improve their memory. Although not included in the Rapp et al. (2002) impact of memory functioning category, comparisons can be made between the MFQ mnemonics subscale and the MCI effort utility subscale. Logically, it would be expected the individuals who report that they often use various mnemonics to help memory functioning would also believe in control over memory through effort (item 14: "If I use my memory often, I won't lose it"). However, correlation analyses revealed that the MFQ mnemonics and MCI effort utility subscales were not significantly related ($r = -0.14$). In other words, the use of mnemonic techniques was not related to the belief that improving memory can be controlled through effortful endeavors.

Responses to the PMC bothersome forgetting question are relevant to the impact of memory functioning category as well, particularly the participants who reported that forgetting

was not bothersome. It would be expected that the individuals who reported forgetting was not bothersome would report that forgetting is not serious on their MFQ responses to the seriousness of forgetting subscale, as bothersome forgetting and seriousness of forgetting both pertain to concerns about memory aging related to memory functioning. A total of 26 participants (proportion score of 0.12) reported forgetting was not bothersome on the PMC bothersome forgetting question. As expected, the 26 participants' ratings for the MFQ seriousness of forgetting subscale (M = 5.02, SD = 0.92) were slightly higher (meaning less serious) than the overall current sample ratings (M = 4.77, SD = 1.22). Overall, PMC responses were similar to the MFQ ratings concerning lapses in memory.

Because the MFQ seriousness of forgetting subscale includes exemplars of forgetting, comparisons can be made to responses to the PMC bothersome forgetting question. Types of forgetting common among the MFQ seriousness subscale and the PMC responses include names, spatial information (for MFQ includes 2 items within the seriousness of forgetting subscale: where you put things and directions to places), and faces. It was predicted that the PMC responses would map on to the MFQ ratings as they were interpreted as representing similar aspects of the memory aging construct.

A total of 16 participants (proportion score of 0.07) reported that names were bothersome to forget for the PMC bothersome forgetting question. A comparison was made between those who reported that names were bothersome to forget on the PMC measure and their responses to the forgetting names question on the MFQ serious forgetting subscale. It would be expected that the individuals who reported forgetting names was bothersome on the PMC question would also report more serious ratings on the MFQ item for forgetting names. However, out of the 16 participants that reported forgetting names was bothersome in their PMC responses, the mean

MFQ rating for the forgetting names item (*M* = 3.28, *SD* = 1.25) did not differ substantially from the mean MFQ rating for the entire sample of the current study (*M* = 3.35, *SD* =1.25). The participants may have believed that forgetting names was bothersome (i.e. irritating or annoying), but did not think it was serious (i.e. grave or important).

Regarding forgetting spatial information, a total of 29 participants (proportion score of 0.13) reported that forgetting spatial information was important on the PMC bothersome forgetting question. It would be expected that those individuals would also rate forgetting spatial information as more serious on the MFQ forgetting spatial information items. Out of those 29 participants, the mean MFQ rating for the forgetting where you put things item (*M* = 4.25, *SD* = 0.50) was slightly lower (meaning more serious) than the overall mean for the entire sample of the current study (*M* = 4.70, *SD* = 1.25). For the forgetting directions to places item, the 29 participants' ratings (*M* = 4.75, *SD* =0.98) were slightly higher than the ratings for the entire sample (*M* = 4.68, *SD* = 1.50). Overall, comparisons of the PMC and MFQ responses indicated that the individuals who rated forgetting spatial information as bothersome were not more likely to rate forgetting spatial information as serious.

In regard to forgetting faces, only 3 participants (proportion score of 0.01) rated forgetting faces as bothersome on the PMC bothersome forgetting question. It would be expected that the participants who rated forgetting faces as bothersome would also rate forgetting faces are more serious on their MFQ responses. The 3 participants' ratings of the MFQ item related to forgetting faces (*M* = 3.33, *SD* = 2.08) were higher than the entire sample's ratings (*M* = 5.15, *SD* = 1.25), but the small number of participants makes it difficult to draw any conclusions.

For the perceived control over memory category, relationships among the MCI potential improvement, effort utility, and inevitable decline subscales were examined. There was a small

positive correlation between the MCI potential improvement and MCI effort utility subscales (r = 0.24), which suggests that as the belief in the control over improving memory is related to the belief in control over memory through effort. No relationship was found between the MCI potential improvement and MCI inevitable decline subscales, indicating that the belief in control over memory improvement was not related to the belief in control over eventual memory decrement. There was a strong negative correlation between MCI effort utility and MCI inevitable decline subscales (r = -0.53). In other words, as beliefs about effortful control over memory increase, beliefs about not having control over memory decline decrease.

Another comparison that can be made is between the MCI inevitable decline subscale and the PMC fears of memory aging question. It would be expected that individuals who believe they have control over memory decline would be less fearful about memory aging (because they could presumably do something to prevent decline). A total of 28 participants (proportion score of 0.15) responded to the PMC fears about memory question by reporting they were not fearful about memory aging. However, the 28 participants' scores on the MCI inevitable decline subscale (M = 3.84, SD = 1.38) were slightly higher than the overall sample (M = 3.67, SD = 1.31), indicating the participants who reported they were not fearful of memory aging also reported stronger agreement with the belief of not having control over memory decline. A possible interpretation of these findings is that some older adults believe they don't have control over memory decline, but they are not fearful of it.

In addition (although not included in a MCI subscale), there are 3 items on the MCI that directly relate to beliefs about developing AD (items 11, 13, and 18; "I think there is a good chance I will get AD") and can be compared to the PMC fears about memory aging question. It would be expected that the participants who reported having a fear of succumbing to a memory-

impairing disease like AD or dementia on the PMC question also reported beliefs in developing AD on the MCI items. A total of 43 participants (proportion score of 0.23) reported they were fearful of developing a memory-impairing disease such as AD. The 43 participants overall reported stronger beliefs in developing AD for the three AD questions' combined average (*M* = 3.01, *SD* = 0.98) as compared to the entire current study sample (*M* = 2.21, *SD* = 1.04). However, both averages indicate that the participants reported disbelief in developing AD. This means that the participants may have reported being fearful of developing AD, but overall do not believe they will develop the disease.

Table 15. Correlations among MCI and MFQ

Variable	1	2	3	4	5	6	7	8
1 MFQ frequency	--							
2 MFQ serious	0.43**	--						
3 MFQ retrospective	0.41**	0.19	--					
4 MFQ mnemonic	0.02	0.18	-0.07	--				
5 MCI present	0.52**	0.26**	0.32**	0.06	--			
6 MCI potential	-0.25**	-0.31**	-0.11	-0.20**	-0.38**	--		
7 MCI effort	0.34**	0.07	0.19	-0.14	0.31**	0.24*	--	
8 MCI inevitable	-0.38**	-0.17	-0.23**	-0.13	-0.42**	0.08	-0.53**	--

* denotes significance, p < .01, **denotes significance, p < .001

RELATIONSHIPS AMONG INDIVIDUAL DIFFERENCE VARIABLES

Correlation analyses were conducted in order to determine the relationships among the individual difference variables and memory aging concerns (operationally defined by the subscales of the MFQ and MCI). Preliminary analyses were performed to ensure there were no violations of the assumptions of multicolinearity, normality, linearity, and homoscedasticity because otherwise, the data would not be appropriate for correlation and regression analyses due to skewed distribution of scores and problems related to the nature of the underlying relationship between the variables. These assumptions were checked from residuals scatterplots generated by the statistical software. The residuals scatterplots provided information on the tolerance, which

was .08, less than the recommended cutoff score of .10, indicating that multicolinearity was not violated (Pallant, 2007). Violations of the assumptions normality, linearity, and homoscedasticity were also checked by the scatterplot data generated in the statistical software. There were no deviations from the centralized rectangle, with most of the scores concentrated in the center, along the center point, indicating no violations of normality, linearity, or homoscedasticity (Pallant, 2007). Age was treated as a continuous variable as reported in the demographic questionnaire. Family history of AD was treated as a dichotomous variable (presence or absence) as reported in the demographic questionnaire. Memory aging concerns were determined by scores on the seriousness of forgetting subscale of the MFQ and the inevitable decrement subscale of the MCI. Knowledge of memory aging was determined by scores on the KMAQ (which was separated into the total score, the normal memory aging score, and the pathological memory aging score). Cognitive status was determined by the MMSE score (which was separated into total score and delayed recall score). Affective status was estimated based on the GDS score.

In order to examine relationships among the individual difference variables, correlation analyses were computed. Table 15 presents intercorrelations among age, family presence of AD, MMSE and MMSE recall (cognitive status), GDS (affective status), KMAQ total proportion correct scores, KMAQ normal memory aging proportion correct scores, KMAQ pathological memory aging correct scores, MFQ seriousness of forgetting subscale scores, and MCI inevitable decline subscale scores. As predicted, age was negatively correlated with MMSE, and MMSE recall (r = -.278, r = -.288 respectively). As age increased, global cognitive status decreased. Family history of AD was not significantly correlated with any of the variables, despite predictions that it would be correlated with both MFQ and MCI scores. The MMSE scores were

not correlated with any of the variables either (with the exception of each other), which does not provide support for the hypothesis that cognitive status would be correlated with both MFQ and MCI scores. GDS was significantly correlated with both the MFQ and MCI as predicted. Results indicated that there is a slight negative correlation between the MFQ and the GDS (r = -.215). The older adults with lower scores on the GDS (indicating fewer symptoms of depression) tended to report that their forgetting was more serious. For the MCI, the reverse trend emerged. Results indicated that there was a low positive correlation between the MCI and the GDS (r = .257). Individuals scoring higher on the GDS (those endorsing more depressive symptoms) had higher scores on the inevitable decrement subscale. In other words, individuals who expressed more depressive symptoms also expressed more memory aging concerns related to memory deterioration. However, it is important to note that only 2.97% of the participants scored a 6 or higher on the GDS indicating mild depressive symptoms. The rest of the participants scored under a 6, indicating that the depressive indicators were not clinically significant.

Regarding the KMAQ, KMAQ total proportion correct and KMAQ normal memory aging correct scores were somewhat negatively correlated with the MCI inevitable decrement scores (rs = -.231 and -.205 respectively). In other words, as knowledge of memory aging increases, scores indicating concern over memory decline decreases. These results support the hypothesis that individuals with more accurate knowledge of memory aging are less likely to express concern that declining memory is inevitable. It is interesting that the relationship is not significant between KMAQ pathological memory aging and MCI scores. However, the relationship is in the same direction and is approaching significance (r = -.198). No other individual variables were significantly correlated with either of the dependent measures (MFQ and MCI) as predicted. The hypotheses that age, family history of AD, and cognitive status (as

measured by MMSE scores) would be significantly related to memory aging concerns (as indexed by MFQ and MCI scores) were not supported. Table 16 presents a summary of the intercorrelations calculated among the individual difference variables.

INDIVIDUAL DIFFERENCE VARIABLE PREDICTORS

Regression analyses are used to explore the relationship between multiple dependent variables and a dependent variable (Pallant, 2007). Regression is more sophisticated than correlation analysis as it provides information about the degree to which specific variables are able to predict a particular outcome. In order to determine the relative contribution of variance associated with age, family history of AD, knowledge of memory aging, cognitive status, and affective status to memory aging concerns, stepwise regression analyses were performed.

Stepwise regression analyses were conducted rather than multiple regression analyses or hierarchical regression analyses because the order of the entry of the predictor variables was not meaningful. The stepwise regression analyses were calculated twice, once for responses to the MFQ subscale, and once for responses to the MCI subscale. The independent contributions of age, family presence of AD, MMSE, MMSE recall, GDS, KMAQ total proportion correct scores, KMAQ normal memory aging proportion correct scores, and KMAQ pathological memory aging correct scores to the two criterion measures of memory aging concerns (MFQ and MCI subscales) were assessed. As expected based on the correlation analyses, results of the regression analyses with the MFQ as the dependent measure indicated that the GDS was the only independent variable to significantly predict variance in the MFQ subscale scores. The GDS scores (indexing affective status) explained 8.40% of the variance in seriousness of forgetting, $F(1, 85) = 7.75$, $p < .001$.

Table 16. Correlations among Individual Difference Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Age	--															
2. AD history	-0.05	--														
3. KMAQ total correct	-0.01	0.12	--													
4. KMAQ normal	0.04	0.14	0.87**	--												
5. KMAQ pathological	-0.08	0.07	0.85**	0.48**	--											
6. MMSE	-0.28**	0.03	0.21*	0.18	0.19	--										
7. MMSE recall	-0.29**	0.09	0.05	-0.03	0.10	0.39**	--									
8. GDS	0.14	-0.03	-0.07	-0.04	-0.05	-0.04	-0.16	--								
9. MFQ frequency	-0.11	-0.14	0.05	0.04	0.06	0.00	-0.01	-0.18	--							
10. MFQ serious	-0.02	-0.03	-0.13	-0.16	-0.07	0.07	-0.05	-0.22*	0.43**	--						
11. MFQ retrospective	0.03	-0.12	0.06	0.06	0.05	-0.01	0.08	-0.21*	0.41**	0.19	--					
12. MFQ mnemonic	0.10	-0.05	-0.18	-0.20	-0.09	-0.04	-0.11	0.13	0.02	0.18	-0.07	--				
13. MCI present	-0.09	-0.05	0.08	0.07	0.06	0.15	0.19	-0.11	0.52**	0.26**	0.32**	0.06	--			
14. MCI potential	0.08	-0.06	0.03	0.13	-0.08	-0.13	-0.06	0.12	-0.25*	-0.31**	-0.11	-0.20*	-0.38**	--		
15. MCI effort	-0.04	-0.09	0.22*	0.22*	0.17	-0.07	0.05	-0.22*	0.34**	0.07	0.19	-0.14	0.31**	0.24*	--	
16. MCI inevitable	0.10	0.10	-0.23*	-0.21*	-0.20	-0.04	-0.03	0.26*	-0.38**	-0.17	-0.23*	-0.13	-0.42**	0.08	-0.53**	--

*denotes significance, $p < .01$; ** denotes significance, $p < .001$

Additionally, as expected based on the correlation analyses, results of the regression analyses with the MCI as the dependent measure indicated that the GDS and the KMAQ total proportion correct scores significantly predicted variance in the MCI subscale scores. GDS was entered at Step 1, explaining 5.60% of the variance in concerns about inevitable memory decline $F (1, 85) = 5.00$, $p < .001$. The KMAQ total proportion correct scores were entered as Step 2 and the total variance accounted for totaled 10.50%, $F (2, 84) = 4.93$, $p < .001$. Overall, only a small amount of variance was accounted for by the predictor variables. Table 17 presents a summary of the regression analyses calculated.

Table 17. Relationships among Individual Difference Variables and Memory Aging Concerns

Dependent Measure		Predictor Variable	R^2	ΔR^2	ß	*F*	*P*
MFQ seriousness	Model 1	GDS	0.08	0.07	-0.30	7.75	<0.01**
MCI inevitable decline	Model 1	GDS	0.06	0.04	0.24	5.00	<0.01**
	Model 2	GDS			0.22	4.93	<0.01**
		KMAQ total	0.11	0.08	0.22		

CHAPTER 4: DISCUSSION

The current study had two goals: to examine the practical, self-reported memory concerns of older adults and to examine the particular individual differences that are predictive of memory aging concerns. Practical memory aging concerns were defined as self-appraisals of memory including apprehension, worry, and fears about aging related to memory. Through the use of both quantitative measures (MFQ and MCI) and qualitative open-ended questions (PMC), a thorough examination of memory functioning concerns was conducted. Regarding the first goal, in general, responses to the quantitative measures were similar to previous findings. As predicted and similar to previous studies on the memory functioning measure, names were commonly reported as a type of serious forgetting. Answers to the open-ended questions provided more in-depth information that obligations to others, spatial information, and important dates were commonly reported as bothersome to forget and fear of developing disease (e.g. dementia or Alzheimer's disease) and fear of losing independence were commonly reported fears of memory aging. An important finding was that the oldest old group (age 90 years and older) frequently reported that they did not have memory aging concerns. A further examination of the findings revealed that some participants reported they did not have memory aging concerns at all, and others reported they were not concerned with memory aging, but also acknowledged types of bothersome forgetting or memory aging fears. Generally, the older adults who reported they were not bothered or fearful of memory aging did not feel concerns about memory aging were important to dwell on. Research on individuals over the age of 90 years is extrememely rare, but valuable, as this segment of the population is one of the fastest growing segments,with the popultaion of older adults expected to more than double to 77 million by the year 2030 (CDC, 2009).

The dependent measures represented different aspects of memory aging concerns and comparisons were made among them in order to draw conclusions about the general construct of memory aging. Memory functioning (particularly seriousness of forgetting), memory controllability, and bothersome or fearful aspects of memory aging concerns were represented by the dependent measures. When comparisons were made among the aspects of memory aging, some similarities were found, but the different aspects of memory aging were also found to contribute unique and separate information as well. Rapp et al. (2002) provided a framework in which to organize comparisons including the following categories: perceived memory ability, impact of memory functioning, and perceived control over memory. Participants' perceptions of their memory ability remained stable among the different aspects of memory aging. Participants' impact of memory functioning was similar among seriousness of forgetting and reports of bothersome forgetting overall, but not the use of techniques to improve memory. In addition, specific lapses in memory such as forgetting names, spatial information, and faces were generally not thought of as both serious to forget and bothersome. Regarding perceived control over memory, control was found to be related to effort. However, control over memory and fears of memory aging were generally not similar in that the older adults reported a lack of control over memory decline, but also reported they were not fearful of it. Comparisons were also made among the individuals who reported fears of developing AD (or other memory-impairing diseases) to and their responses to believing they will develop AD. Older adults may be fearful of developing AD, but not believe they will develop it.

The second goal was to investigate the contribution of individual difference to older adults' self-perceived memory functioning. Age, presence or absence of family members with Alzheimer's disease as indicated by self report, knowledge of memory aging (indexed by the

Knowledge of Memory Aging Questionnaire), cognitive status (indexed by the Mini-Mental State Exam), and affective status (indexed by the Geriatric Depression Scale) were the individual difference factors that were expected to influence memory aging concerns. However, only knowledge of memory aging and affective status were found to be significantly related to the quantitative measures. Results indicated that knowledge of memory aging and affective status were the only significant predictors of memory aging concerns as well. In the following sections, the current findings and implications are addressed. Finally, limitations of the present study are discussed along with future directions for research.

CURRENT FINDINGS AND IMPLICATIONS

Age

It was hypothesized that as age increases, concerns about memory increase as well. This hypothesis was based on the reasoning that as older adults age, they are naturally more likely to encounter individuals with dementia and other conditions that result in memory decline, and thus it was predicted that they consequently worry about their own health as a result of the encounters (Cutler & Hodgson, 2001; Centofanti, 1998). In addition, the hypothesis gains further legitimacy based on previous studies showing that as older adults age, they more frequently recognize personal lapses in memory (Cavanaugh et al., 1983; Gilewski & Zelinski, 1986). Nonetheless, the prediction that as older adults age, memory concerns increase, was not supported. Despite the span of 30 years in age, age was not found to be an influential factor. In fact, the opposite trend (as older adults age increase, they express fewer worries about memory) was revealed in participants' responses to the open-ended questions. As older adults age, they may be resilient to life changes and in particular, memory aging changes. It is also possible that as older adults age, they may be more accepting of any changes or declines in memory ability

Personality traits may help to explain why age was not influential in the current study. Of personality theories, one of the most well-known and supported theories is the Five Factor Model (FFM). FFM was first presented by McCrae and Costa (1987). FFM is based on the idea that there are five basic traits of personality that all individuals share and that are able to explain all of personality as a whole. The traits include neuroticism, extraversion, openness, agreeableness, and conscientiousness. Overall, personality traits have been reported to remain fairly stable over the lifespan (McCrae & Costa, 1987), but more recent research has provided evidence that personality traits change during older adulthood. Costa and McCrae (2002) reported that emotional stability becomes less variable in older adulthood, and agreeableness and conscientiousness tend to increase with age. Noftle and Fleeson (2010) found that agreeableness, conscientiousness, and emotional stability increase over the lifespan. Additionally, the older adults exhibited a more positive personality profile in comparison to the young and middle aged adults. The authors estimated that the positive personality trend is a trajectory that continues across older adulthood (Noftle & Fleeson, 2010).

Taken together, personality psychology provides a framework for understanding why the oldest old in the current study often expressed that they did not have memory aging concerns. Adults over the age of 90 may be generally more positive, agreeable, and emotionally stable than any other segment of the population. Therefore, oldest old adults may be less likely to worry or have apprehensions about memory aging. On the other hand, it may be worthwhile to examine the influence of other personality traits on memory concerns. For example, personality traits (high emotional distress among others) were demonstrated to influence memory concerns (Brown, Dodrill, Clark, & Zych, 1991). Pearman and Storandt (2004) also found that personality traits influenced memory complaints in older adults. Therefore, future studies could incorporate

this by including personality measures when investigating the memory aging concerns of the oldest old.

AD History

Regarding family history of AD, it was predicted that those with a family history of AD would express more memory aging concerns than those without. This hypothesis was made in part on the basis of findings by Cutler and Hodgsen (2001) in which middle aged adults with parents with AD expressed more concern about developing AD than middle adult middle aged adults with no parental history of AD. Results of the current study did not support this hypothesis as the presence of AD was not correlated with the quantitative measures of memory concerns (MFQ and MCI) and results were not clear for the qualitative measure. A total of 31 participants out of 101 reported a family history of AD and the smaller percentage may have influenced results. However, overall the trend for the qualitative measure was that the participants without a family history of AD were more likely to report that they did not have concerns about memory aging than the individuals that did. Nonetheless, no conclusions can be made from the current study that a family history of AD has an influence on memory concerns. This finding is particularly surprising considering how often AD and other dementias are presented in the media and elsewhere. Intuitively, one would expect that individual with first-hand experience with AD would seek out information about the disease in order to learn about something so personal.

Memory Aging Concern Measures

Results of the memory aging concerns measures were expected to replicate previous results of the measures. This study also provides further, more in-depth information about older adults' self-reports of memory functioning. Overall, the memory controllability measure and memory functioning measure results were similar to previous administrations. The responses to

the open-ended questions were also similar to previous findings. When considered together, results from all three measures indicate the types of forgetting that are bothersome for the older adults. Forgetting names was predicted to be a type of forgetting that is worrisome and results of the current study provide support for the prediction from multiple measures. Forgetting spatial information was also reported to be concerning in multiple measures. Forgetting obligations to others was reported the most frequently as the type of forgetting that is most bothersome in the open-ended questions. Regarding memory concerns that relate to fears of memory aging, it was hypothesized that a fear of inevitable detriment would be reported. This hypothesis was confirmed by multiple dependent measures of memory aging concerns. A general sense of a lack of control over memory decline was reported in the memory controllability measure, but participants reported a fear of developing AD or another form of dementia only in the open-ended responses. Participants did not report they expected to develop a memory-impairing disease. Responses to the open-ended questions also indicated that a general fear of losing independence was common among participants.

On a positive note, it is important to recognize that overall, the results do not support the hypothesis that older adults have negative self-reports of memory functioning or are particularly fearful of memory aging. A major benefit of using open-ended questions was that they allowed for individualized responses. When afforded the opportunity to respond that they did not have worries or apprehensions about memory aging, participants frequently reported that they did not have memory aging concerns. Commonly reported responses to the bothersome forgetting question were that no type of forgetting was bothersome. For the fear of memory aging question, the participants also frequently reported that they were not fearful of memory aging.

Knowledge of Memory Aging

Knowledge of memory aging (examined using the KMAQ which allows separation between knowledge of normal memory aging from pathological memory aging) was predicted to influence memory aging concerns, and results from one of the quantitative measures (the memory control measure) supported this hypothesis. This hypothesis was made in part on the basis of the Hawley et al. (2006) study which found that out of three different age groups: middle aged adults (40-59 years), young-old adults (60-79 years), and very old adults (80 years and older), the very old adults were the least knowledgeable about memory aging. The hypothesis was also made in part due to the findings of the Jackson et al. (2008) and Cherry et al. (2009) studies which found that individuals with direct contact with older adults were more knowledgeable about memory aging than individuals without direct older adult contact. Based on the aforementioned studies, it was logical to predict that since the participants of the current study were older adults, they would be less knowledgeable about memory aging and thus more likely to be concerned with memory lapses that occur in everyday life associated with normal memory aging and possibly attribute them to be pathological memory changes.

The current study supported the prediction for one of the memory concerns measures. The knowledge of memory aging measure total proportion correct and normal memory aging correct scores were negatively correlated with the memory aging concern measure related to control of memory, meaning that as knowledge of memory aging decreases, scores indicating concern over memory decline increases. The knowledge of memory aging measure total proportion correct scores were also significantly predictive of the memory control measure, meaning that the scores were not only significantly related, but the knowledge of memory aging measure escores predicted 4.90% of the variance in the memory controllability measure. The

knowledge of memory aging measure scores were not significantly related to the memory functioning measure. It may be that knowledge of memory aging allows individuals to be knowledgeable about decline in memory ability in individuals with memory-impairing conditions as well as healthy individuals. The measure of control over memory decline was related to knowledge of memory aging, but the measure of functioning (related to issues of forgetting) was not. It is not surprising that individuals with less accurate knowledge on memory aging would feel less control over memory decline.

Cognitive Status

Cognitive status was also predicted to influence memory aging concerns. This prediction was supported by the Lopez et al. study (2002) which demonstrated that cognitively impaired individuals more frequently exhibit psychological distress than non-impaired individuals. Deficits in cognitive functioning were expected to contribute to memory worries and fears. Since prior research demonstrated recall of the words was a better indicator of cognitive status than the overall composite score of the cognitive status measure (Loewenstein et al., 2000), the delayed recall portion of the cognitive status measure was also included in analyses. Results of the current study did not support the prediction that overall cognitive status contributes to memory aging concerns. The cognitive measure total scores and delayed recall scores were not significantly related to the memory concern measures. Although previous research found that a score of 30 in comparison to a score of 25 is deemed a considerable difference in cognitive functioning (Folstein et al., 1975), it is likely that the cognitive status scores were not reflective of cognitive status as a whole and instead only provided a brief representation of cognitive functioning. It is also possible that range restriction for the cognitive status measure selected contributed to the non-significant correlations found in this study. Future research with a more

heterogeneous sample with greater variability in cognitive status would be necessary to provide a more definitive analysis of this issue.

Affective Status

Affective status and particularly depressive symptoms were predicted to influence worries and apprehensions about memory. Prior research has found that older adults with depression complain more about memory problems than non-depressed individuals (Bäckman et al, 1994). Results of the current study provide some support for the hypothesis that affective status contributes to memory aging concerns. Affective measure scores were significantly related to the memory aging concerns measures. The affective measure was also a significant predictor of the memory aging concerns measures. In other words, indicators of depressive symptoms were predictive of memory aging concerns. This finding is especially valuable because the current study did not include a clinically depressed sample and slight variations in depressive indicators was enough to provide insight as to the effects of affective status on worry and apprehension about memory.

LIMITATIONS AND RECOMMENDATIONS

A number of individual difference variables that were not the focus of the current study may influence memory aging concerns. Race, gender, maritial status, educational attainment, and personality traits are a few examples of alternative individual difference varaibles that could have been targeted. Data were available for race, gender, marital status, and educational attainment, and correlational analyses were computed in order to determine if they were significantly related to the quantitative memory concern measures, but no significant relationships were determined. It may be worthwhile to further examine the effects of other individual difference variables on memory aging concerns in future studies. For example, gender

as well as marital status were demonstrated to be predictors of concern in developing AD (Cutler & Hodgson, 2001). Women and married individuals express greater concern in developing AD than men and individuals who are not married. Educational status has also been shown to be a individual difference variable that influences subjective reports related to memory. For example, educational status and verbal ability were found to significantly influence self-reported memory functioning (Reese & Cherry, 2006). Individuals with fewer years of education and lower performance of verbal intelligence tests reported memory loss as more serious than indivuals with higher educational status and higher verbal ability. According to Reese and Cherry (2006), these findings provide evidence for the importance of examining the role of individual differences in self-reported memory functioning. Also, the authors note that personal conerns regarding memory functioning may be different for adults of lower ability and education in comparison to adults of higher education and ability (Reese & Cherry, 2006). Personality variables may also influence memory aging concerns as discussed previously. Overall, there are many potential individual difference variables that would be worthwhile to examine and this study helps to highlight the importance of considering individual difference variables before drawing conclusions about subjective memory appraisal and memory aging concerns.

One limitation of the current study is that the participants were a homogeneous group and so generalizability of the findings may be limited to largely middle class and healthy Caucasians. The sample was drawn from one southern state and may not generalize to older adults from other geographic areas or racial or ethnic groups. In addition, because the majority of participants lived independently in the community, the findings are not representative of older adults living in assisted living homes or nursing homes, both of which are common living arrangements for the older adult population. Also, a younger adult control group would be desirable in future research

to increase the variability in responses to the present measures and permit developmentally motivated hypotheses. Future research that examines the memory aging concerns of a larger and more heterogeneous sample would be necessary before broad-based inferences to the older adult population would be warranted. Additionally, future investigations would benefit from a longitudinal study of similar methodological design to complement the findings of this study and allow more information on how memory aging concerns change within individuals over time.

It is also possible that there was a selection bias related to how participants were recruited because individuals were informed that the study was on the topic of memory. Individuals concerned about memory or individuals confident about their own memory ability may be more heavily represented. Individuals who agreed to participate in the current study may have self-selected for a variety of unknown reasons that may be biased; however this research represents an important first step in studying this population.

Another limitation of the current study is that it relies on self reports of memory. Self-reports of memory are subjective in nature and can be at risk of being influenced by many different variables (Reese & Cherry, 2004). Additionally, research on how accurate older adults are at describing their memory ability is mixed and some studies have suggested that memory self-appraisal declines with age (Mol et al., 2008). Therefore, research employing self-reports of memory may be distorted. Future studies incorporating objective memory tests in addition to subjective memory tests would be warranted.

IMPLICATIONS FOR THE FUTURE

The proportion of older adults is on the rise as a result of the Baby Boomer generation aging. Consequently, the need for systematic research on the concerns of this large portion of the population becomes increasingly necessary. In particular, many older adults may face the

potential of experiencing pathological aging secondary to disease states such as AD or other factors. Thus, it is not surprising that concerns with memory aging are widespread among the older adult population. The results of the present research provide new evidence on the memory aging concerns of the oldest old, which is valuable by itself as research on older adults over the age of 90 years is very rare (Bäckman et al., 2000). The proposed study's ultimate goal was to provide insight as to the variables influencing older adults' memory aging concerns and detailed knowledge on exactly the memory aging concerns they express. Although the current project is correlational in nature, and thus no causal relations can be inferred, the present study is able to inform us as to the relationships among various individual differences to memory aging concerns. These data provides useful knowledge as to the variables that could be targeted for intervention. It was hypothesized that presence or absence of family members will influence the MFQ and MCI measures. Specifically, the older adults with AD relatives were predicted to report more serious memory concerns than the group of older adults with no family history of AD. This was predicted on the basis that the individuals with family history of AD are more sensitive to memory lapses and thus more concerned with memory aging changes. Although results did not support this finding, more research on this subject is warranted. One direction for future interventions would be to educate those with family history of AD on the facts of normal versus pathological memory aging, perhaps by using the KMAQ as a tool to measure increases in scores with education.

It was hypothesized that individuals with more knowledge on normal and pathological aging will be less likely to worry about memory aging. Results supported this finding. Educational programming targeting older adults may be helpful in reducing memory aging concerns. Another intervention opportunity would be to recruit the older adults with family

history of AD into support groups or to encourage them to get screened early for dementia. Early detection of dementia leads to better treatment options and thus quality of life (Andreason, 2001).

Overall, the current study not only provided a greater understanding of the memory concerns of older adults and the contributing individual differences, but also provided a framework for important and valuable practical applications. Studying the individual differences that are predictive of memory aging concerns is valuable in targeting particular older adults for educational programs and clinical interventions. Educational programs could be designed from the knowledge gained from this study to educate older adults on the changes in cognitive changes that occur with age, the specific features of pathological aging such as AD, the heredity of various dementia-related diseases, and memory self-improvement. In regard to clinical interventions, memory aging fears can be addressed through personalized clinical interventions in order to improve quality of life. Behavioral and cognitive treatment plans could be tailored using individualized information attained about memory aging fears. This research project has the potential to be the catalyst for endless educational and clinical projects aimed at improving the everyday lives of older adults.

REFERENCES

Anafara, V.A., Brown, K.M., & Mangione, T.L. (2002). Qualitative Analysis on Stage: Making the Research Process More Public. *Educational Researcher, 21,* 28-38.

Andreasen, N.C. (2001). *Brave new brain. Conquering mental illness in the era of the genome*. New York: Oxford University Press.

Bachman, D. L., Wolf, P.A., Linn, R.T. (1993). Incidence of dementia and probable Alzheimer's disease in a general population: The Framingham Study. *Neurology, 43,* 515-519.

Bäckman, L., Forsell, Y. (1994). Episodic memory functioning in a community-based sample of old adults with major depression: Utilization of cognitive support. *Journal of Abnormal Psychology, 103*(2), 361-370.

Bäckman, L., Small, B. J., Wahlin, A., & Larsson, M. (2000). Cognitive functioning in very old age. In F. I. M. Craik & T. A. Salthouse (Eds), *The handbook of aging and cognition* (2nd ed., pp. 499-558). Mahwah, New Jersey: Erlbaum.

Berry, J. M., West, R. L., & Dennehey, D. M. (1989). Reliability and validity of the Memory Self-Efficacy Questionnaire. *Developmental Psychology, 25,* 701-713.

Brown, F.H., Dodrill, C.B., Clark, T., and Zych, K. (1991). An investigation of the relationship between self-report of memory functioning and memory test performance. *Journal of Clinical Psychology, 47,* 772-777.

Bruce, P.R., Coyne, A., & Botwinick, J. (1982). Adult age differences in metamemory. *Journal of Gerontology, 37,* 354-357.

Cavanaugh, J.C., Feldman, J.M., Hertzog, C. (1998). Memory beliefs as social cognition: A reconceptualization of what memory questionnaires assess. *Review of General Psychology, 2,* 48-65.

Cavanaugh, J.C. & Pearlmutter, M. (1982). Metamemory: A critical examination. *Child Development, 53,* 11-28.

Center for Disease Control and Prevention (2009, October). *Alzheimer's Disease.* Retrieved from www.cdc.gov/Features/Alzheimers

Centofanti, J. (1998). Fear of Alzheimer's undermines health of elderly patients. Article appearing in the *American Psychological Association Monitor,* Vol. 29, Number 6, June 1998.

Cherry, K.E., Allen, P. D., Boudreaux, E. O., Robichaux, M., & Hawley, K.S. (2009). Knowledge of memory aging in students, caregivers and senior service providers. Educational Gerontology, 35, 541-552.

Cherry, K.E. & Brigman, S. (2005). Memory failures appraisal in younger and older adults: role of individual difference and event outcome variables. Journal *of Genetic Psychology, 166(4),* 435-450.

Cherry, K. E., Brigman, S., Hawley, K. S., & Reese, C. M. (2003). The Knowledge of Memory Aging Questionnaire: Effects of adding a "don't know" response option. *Educational Gerontology, 29*, 427-446.

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

Cherry, K.E., & Plauche, M. (1996). Memory impairment in Alzheimer's disease: Findings, interventions, and implications. *Journal of Clinical Geropsychology, 2*, 263-296.

Cherry, K.E., West, R.L., Reese, C.M., Santa Maria, M.P., & Yassuda, M. (2000). The knowledge of memory aging questionnaire. *Educational Gerontology, 26*, 195-219.

Connor, L.T., Dunlosky, J., & Hertzog, C. (1997). Age-related differences in absolute but not relative metamemory accuracy. *Psychology and Aging, 12(1),* 50-71.

Cook, S. & Marsiske, M. (2006). Subjective memory beliefs and cognitive performance in normal and mildly impaired older adults. *Aging and Mental Health, 10(4),* 413-423.

Correa, D.D., Graves, R.E., Costa, L. (1996). Awareness of memory deficit in Alzheimer's disease patients and memory-impaired older adults. *Aging, Neuropsychology, and Cognition, 3*(3), 215-228.

Costa, P.T., Jr. & McCrae, R.R. (2002). *NEO Five-Factor Inventory: Interpretive Report*. Lutz, Fl: Psychological Assessment Resources.

Craik, F. I. M., & Jennings, J. M. (1992). Human memory. In F. I. M. Craik and T. A. Salthouse (Eds.), *The handbook of aging and cognition* (1st ed., pp. 51-110). Hillsdale, NJ: Erlbaum.

Crane, M.K., Bogner, H.R., Brown, G.K., Gallo, J.J. (2007). The link between depressive symptoms, negative cognitive bias and memory complaints in older adults. *Aging and Memory Health, 11(6),* 708-715.

Crawford, J.R., Henry, J.D., Ward, A.L. & Blake, J. (2006). The prospective and retrospective memory questionnaire (PRMQ): Latent structure, normative data and discrepancy analysis for proxy-ratings. *British Journal of Clinical Psychology, 45*, 83-104.

Cutler, S. J. & Hodgson, L. G. (2001). Correlates of personal concerns about developing Alzheimer's disease among middle-aged persons. *American Journal of Alzheimer's Disease and Other Dementias, 16,* 335-343.

Dark-Freudeman, A.,West, R.L., & Viverito, K.M. (2006). Future selves and aging: Older adults' memory fears. *Educational Gerontology, 32,* 85-109.

de Frias, C.M. & Dixon, R.A. (2005). Confirmatory factor structure and measurement invariance of the memory compensation questionnaire. *Psychological Assessment, 17,* 168-178.

Duke, L.M. (2001). Underawareness of deficit in Alzheimer's disease:Convergent validation of metamemory tasks and the relationship to risky behavior. *Dissertation Abstracts International: Section B: The Sciences and Engineering, 61*(8-B), 4399.

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39,* 175-191.

Floyd, M. & Scogin, F. (1997). Effects of memory training on the subjective memory functioning and mental health of older adults: A meta-analysis. *Psychology and Aging, 12(1*), 150-161.

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

Gilewski, M. J., & Zelinski, E. M. (1986). Questionnaire assessment of memory complaints. In L. W. Poon, T. Crook, K. L. Davis, C. Eisdorfer, B. J. Gurland, A. W. Kaszniak, & L. W. Thompson (Eds.), *Handbook for clinical memory assessment of older adults* (pp. 93-107). Washington, DC: American Psychological Association.

Gilewski, M. J., Zelinski, E. M., & Schaie, W. K. (1990). The memory functioning questionnaire for assessment of memory complaints in adulthood and old age. *Psychology and Aging, 5,* 482-490.

Hawley, K. S., Cherry, K. E., Su, J., Chiu, Y., Jazwinski, S. M. (2006). Knowledge of memory aging in adulthood. *International Journal of Aging and Human Development, 63,* 317-334.

Hertzog, C., Hultsch, D.F., & Dixon, R.A.(1989). Evidence for convergent validity of two self-report metamemory questionnaires. *Developmental Psychology, 25(6),* 687-700.

Hertzog, C., Park, D.C., Morrell, R.W., & Martin, M. (2000). Ask and ye shall receive: Behavioral specificity in the accuracy of subjective memory complaints. *Applied Cognitive Psychology 14,* 257-275.

Hertzog, C., Saylor, L.L., Fleece, A.M., Dixon, R.A. (1994). Metamemory and aging: Relations between predicted, actual, and perceived memory task performance. *Aging and Cognition, 1(3),* 203-237.

Hess, T.M. & Hinson, J.T. (2006). Age-related variation in the influences of aging stereotypes on memory in adulthood. *Psychology and Aging, 21(3),* 621-625.

Hess, T.M., Hinson, J.T., & Statham, J.A. (2004). Explicit and implicit stereotype activation effects on memory: Do age and awareness moderate the impact of priming? *Psychology and Aging, 19(3),* 495-505.

Hines,J.C., Touran, J.R., & Hertzog, C. (2009). Metacognitive influences on study time allocation in an associative recognition task: An analysis of adult age differences. *Psychology and Aging, 24(2),* 462-475.

Jackson, E.M., Cherry, K.E., Smitherman, E.A., & Hawley, K.S. (2008). Knowledge of memory aging and Alzheimer's disease in college students and mental health professionals. *Aging and Mental Health, 12,* 258-266.

Jopp, D. & Hertzog, C. (2007). Activities, self-referent memory beliefs, and cognitive performance: Evidence for direct and mediated relations. *Psychology and Aging, 22(4),* 811-825.

Kahn, R.L., Zarit, S.H., Hilbert, N.M. & Niederehe, G. (1975). Memory complaint and impairment in the aged. *Archives of General Psychiatry, 32,* 1569-1573.

Kausler, D.H. (1994). *Learning and Memory in Normal Aging*. (pp. 106-122). San Diego: Academic Press.

Kinsella, G., Murtaugh, D., Landry, A., Homfray, K., Hammond, M., O'Beirne, L., Dwyer, L., Lamont, M., & Ponsford, J. (1996). Everyday memory following traumatic brain injury. *Brain Injury, 10(7),* 499-507.

Koriat, A., & Goldstein, M. (1996). Monitoring and Control Processes in the Strategic Regulation of Memory Accuracy. *Psychological Review, 103(3),* 490-517.

Lachman, M.E. & Andreoletti, C. (2006). Strategy use mediates the relationship between control beliefs and memory performance for middle-aged and older adults. *Journal of Gerontology, 61(2),* 88-94.

Lachman, M. E., Bandura, M., Weaver, S. L., & Elliott,E. (1995). Assessing memory control beliefs: The Memory Controllability Inventory. *Aging and Cognition, 2,* 67-84.

Lachman, M.E.,Weaver, L.W., Bandura, M., Elliott, E., & Lewkowicz, C.J. (1992). Improving memory and control beliefs through cognitive restructuring and self-generated strategies. *Journal of Gerontology, 47(5),* 293-299.

Lane, C.J. & Zelinski, E.M. (2003). Longitudinal hierarchical linear models of the memory functioning questionnaire. *Psychology and Aging, 18(1),* 38-53.

Loewenstein, D. A., Barker, W. W., Harwook, D. G., Luis, C., Acevedo, A., Rodriguez, I., & Duara, R. (2000). Utility of a modified mini-mental state examination with extended delayed recall in screening for mild cognitive impairment and dementia among community dwelling elders. *International Journal of Geriatric Psychiatry, 15,* 434-440.

Lopez, O. L., Becker, J. T., & Sweet, R. A. (2005). Non-cognitive symptoms in mild cognitive impairment. *Neurocase, 11,* 65-71.

Mather, M. (2004). Aging and emotional memory. In D. Reisberg & P. Hertel (Eds.) *Memory and emotion* (pp. 272-307). New York: Oxford University Press.

McCrae, R. R., & Costa, P.T., Jr. (1987). Validation of the five-factor model of personality across instruments and observers. *Journal of Personality and Social Psychology, 52,* 81-90.

McDonald-Miszczak, L., Hertzog, C., & Hultsch, D.F. (1995). Stability and accuracy of metamemory in adulthood and aging: A longitudinal analysis. *Psychology and Aging, 10(4),* 553-564.

Mol, E.M., Ruiter, A.C., Verhey, R.J., Dijkstra, J. & Jolles, J. (2008). A study into the psychosocial determinants of perceived forgetfulness: Implications for future interventions. *Aging and Mental Health, 12(2),* 167-176.

Mol, van Boxtel, Willems, & Jolles, (2006). Do subjective memory complaints predict cognitive dysfunction over time. A six-year follow-up of the Maastricht Aging Study. *International Journal of Geriatric Psychiatry, 21,* 442-441.

Morey, C.E., Cilo, M., Berry, J. & Cusick, C. (2003). The effect of Aricept in persons with persistent memory disorder following traumatic brain injury: a pilot study. *Brain Injury, 17(9),* 809-815.

National Institute of Mental Health (2010, January). *The numbers count: Mental diseases in America*. Retrieved from www.nimh.nih.gov./health/the-numbers-count-mental-disorders-in-america

Neath, I. & Surprenant, A. M. (2003). Memory development. *Human Memory (*pp. 315-342). Belmont: Thompson Wadsworth.

Nelson, T.D. (2002). *Ageism: Stereotyping and prejudice against older persons.* Cambridge: MIT Press.

Newman, S., Karip, E., & Faux, R.B. (1995). Everyday memory function of older adults: The impact of intergenerational school volunteer programs. *Educational Gerontology, 4*, 569-580.

Noftle, E.E. & Fleeson, W. (2010). Age differences in big five behavior averages and varabilities across the adult life span: Moving beyond retrospective, global summary accounts of personality. *Psychology and Aging, 25(1),* 95-107.

Nunnally, J. C. & Bernstein, I. H. (1994). *Psychometric Theory* (3rd ed.). NY: McGraw-Hill.
Pallant, J. (2007). *SPSS Survival Manual*. New York: McGraw Hill.

Pearman, A. & Storandt, M. (2004). Predictors of subjective memory in older adults. *Journal of Gerontology, 59(1),* 4-6.

Pedone, R., Cosenza, M., & Nigro, G. (2005). A contribution to the Italian adaptation of the Memory Functioning Questionnaire. *Testing Psicometria Metodologia, 12(3),* 203-219.

Petersen, R. C., Smith, G. E., Waring, S. C., Ivnik., R. J., Kokmen,E., & Tangalos, E. G. (1997). Ageing, memory, and mild cognitive impairment. *International Psychogeriatrics*, 9, 65-70.

Petersen, R. C., Smith, G. E., Waring, S. C., Ivnilk, R. J., Tangalos, E. G., & Kokmen, E. (1999). Mild cognitive impairment: clinical characteristics and outcome. *Arch Neurology*, 56, 303-308.

Rapp, S., Brenes, G., & Marsh, A.P. (2002). Memory enhancement training for older adults with mild cognitive impairment: a preliminary study. *Aging & Mental Health, 6(1)*, 5-11.

Reese, C.M., & Cherry, K.E. (2004). Practical memory concerns across the lifespan. *International Journal of Aging and Human Development, 59*, 237-255.

Reese, C.M. & Cherry, K.E. (2006). Effects of age and ability on self-reported memory functioning and knowledge of memory aging. *The Journal of Genetic Psychology, 167(2)*, 2-20.

Reese, C. M., Cherry, K. E., & Copeland, A. (2000). Knowledge of normal versus pathological memory aging in younger and older adults. *Aging, Neuropsychology, and Cognition, 7*, 1-8.

Reese, C.M., Cherry, K.E., & Norris, L.E. (1999). Practical memory concerns of older adults. *Journal of Clinical Geropsychology, 5*, 231-244.

Rosen, A.C., Prull, M.W., Gabrieli, J.D.E., Stoub, T., O'Hara, R., Friedman, L., Yesavage, J.A., & deToledo-Morrell, L. (2003). Differential Associations Between Entorhinal and Hippocampal Volumes and Memory Performance in Older Adults. *Behavioral Neuroscience, 117(6),* 1150-1160.

Rubio, D.A. & Pertero, C.F (2008). Validation of the reduced Spanish version of the Memory Functioning Questionnaire (MFQ) in a sample of elderly people over 55 years old. *Anales de Psicologia, 24(2),* 320-326.

Serra, M.J., Dunlosky, J., & Hertzog, C. (2008). Do older adults show less confidence in their monitoring of learning? *Experimental Aging Research 34,* 379-391.

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

Small, G.W., Chen, S.T., Komo, S., Ercoli, L., Miller, K., Siddarth, P., Kaplan, A., Dorsey, D., Lacertsky, H., Saxena, S., & Bookheimer, S.Y. (2001). Memory and self-appraisal and depressive symptoms in people at genetic risk for Alzheimer's disease. *International Journal of Geriatric Psychiatry, 16*, 1071-1077.

Stine-Morrow, E.A.L., Milinder, L., Pullara, O. & Herman, B. (2001). Patterns of resource allocation are reliable among younger and older readers. *Psychology and Aging, 16(1),* 69-84.

Strauss, E., Bielak, A.M., Bunce, D., Hunter, M.A., & Hultsch, D.F. (2007). Within-person variability in response speed as an indicator of cognitive impairment in older adults. *Aging, Neuropsychology, and Cognition, 14*, 608-630.

Taylor, J.L., Miller, T.P., & Tinklenburg, J.R. (1992). Correlates of memory decline: A 4-year longitudinal study of older adults with memory complaints. *Psychology and Aging, 7(2),* 185-193.

Tombaugh, T.N., & McIntyre, N.J. (1992). The mini-mental state examination: A comprehensive review. *Journal of American Geriatric Society, 40,* 922-935.

Troyer, A.K. & Rich, J.B. (2002). Psychometric properties of a new metamemory questionnaire for older adults. *Journals of Gerontology: Series B: Psychological Sciences and Social Sciences, 57*, 19-27.

Turkington, C., & Galvin, J. E. (2003). *The Encyclopedia of Alzheimer's Disease*. New York, NY: Facts on File, Inc.

Verhaeghen, P.,Van Ranst, N., & Marcoen, A. (1993). Memory training in the community: Evaluations by participants and effects on metamemory. *Developmental Psychology, 2*, 525-534.

Vogel, A., Stokholm, J., Gade, A., Andersen, B.B., Hejil, A.M., Waldemar, G. (2004). Awareness of deficits in mild cognitive impairment and Alzheimer's Disease: Do MCI patients have impaired insight? *Dementia and Geriatric Cognitive Disorders, 17,* 181-187.

Watkins , P., Gouvier, W. D., Gallon, E., & Barkenmeyer, C. (1989). Equivalence of items on the mini-mental state. *Archives of Clinical Neuropsychology 4(4),* 381-384.

Wechsler, D. (1997). *Wechsler Adult Intelligence Scales* (WAIS-III), 3rd Edition. San Antonio, TX: Harcourt Brace & Co.

Woolverton, M., Scogin, F., Shackelford, J., Black, S., & Duke, L. (2001). Problem-targeted memory training for older adults. *Aging, Neuropsychology and Cognition, 8(4),* 241-255.

Yesavage, J.A., Brink, T.L., Rose, T.L., Lum, O., Huang, V., Adey, M.B., & Leirer, V.O. (1983). Development and validation of a geriatric depression screening scale: A preliminary report. *Journal of Psychiatric Research, 17,* 37-49.

Zacks, R.T., Hasher, L. & Li, K.A.H. (2000). Human Memory. In F.I.M. Craik & T.A. Salthouse (Eds.), *The handbook of aging and cognition* (pp. 293-357). Mawah, NJ: Laurence Erlbaun Associates, Inc.

Zandi, T. (2004). Relationship between subjective memory complaints, objective memory performance, and depression among older adults. *American Journal of Alzheimer's Disease, 19,* 353-360.

Zeisel, J., Silverstein, N.M., Hyde, J., Levkoff, S., Lawton, M.P., & Holmes, W. (2003). Environmental correlates to behavioral health outcomes in Alzheimer's special care units. *The Gerontologist, 43,* 697-712.

Zelinski, E.M. & Gilewski, M.J. (2004). A 10-item Rasch modeled memory self-efficacy scale. *Aging & Mental Health, 8(4),* 293-306.

Zelinski, E. M., Gilewski, M. J., Anthony-Bergstone, C. R. (1990). Memory functioning questionnaire: Concurrent validity with memory performance and self-reported memory failures. *Psychology and Aging, 5*, 388-399.

Zelinski, E. M., Gilewski, M. J., Schaie, K.W. (1993). Individual differences in cross-sectional and 3-year longitudinal memory performance across the adult life span. *Psychology and Aging, 8,* 176-186.

APPENDIX A: DEMOGRAPHIC QUESTIONNAIRE

1. How would you rate your health at the present time? ***(circle one option)***
   1. excellent 2. good 3. fair 4. poor

2. How much do health troubles stand in the way of your doing things you want to do?
   1. not at all 2. a little (some) 3. a great deal

3. Do you think your health is better, the same as, or worse than most people your age?
   1. better 2. same 3. worse

4. Number of nights you stayed as a patient in the hospital in the past year:
   1. none 2. 1 to 3 3. 4 to 6 4. over 6

5. What is your average monthly out of pocket cost for physician prescribed medications? _____
_____
_____

6. Do you have health insurance?
   1. no
   2. yes

7a. Are you currently receiving Medicare?
   1. no
   2. yes; If yes, are you receiving:
      Medicare: Part A (hospital)
      Medicare: Part B (for doctors)
      Both parts

7b. Do you have a Medicare supplemental plan?
   1. no
   2. yes; If yes, what kind of policy?
      Oschner 65
      Tenet 65
      Other _____

7c. Do you have additional insurance coverage available to you as a retiree of a public or private entity/institution?
   1. no
   2. yes; If yes, what kind of policy?
      State Group PPO
      State Group EPO
      Oschner
      Other _____

7d. Are you carrying a private health insurance policy?

1. no
2. yes; If yes, what kind of policy?
   - Blue Cross
   - PPO
   - HMO
   - Aetna
   - Other _____

   If yes, did you obtain this policy through your employer/union:
   1. no
   2. yes

8. Your marital status:
   1. never married
   2. married
   3. divorced or separated
   4. widowed

   If married, for how many years? _____

9. What has been your usual occupation or job - the one you have worked at the longest?

   Job/occupation

   Type of industry or business (what does the company do or make)

   Your usual activities or duties in the job

   Years in this job
   [__][__] Years *(Don't know - record 99)*

10. If married, what has been your spouses' usual occupation or job?

    Job/occupation

    Type of industry or business (what does the company do or make)

    Your usual activities or duties in the job

    Years in this job
    [__][__] Years *(Don't know - record 99)*

11. Years of Education:

SELF: ____ years
(circle one option)

Less than 7th grade
7th-9th grade
10th-11th grade
High School graduate
Partial college or specialized training (at least 1 yr)
College or university graduate
Graduate degree

IF MARRIED, SPOUSE: ____ years
(circle one option)

Less than 7th grade
7th-9th grade
10th-11th grade
High School graduate
Partial college or specialized training (at least 1 yr)
College or university graduate
Graduate degree

12. How many clubs or social organizations do you belong to? (include church and other community activities)

1. none
2. 1 to 3
3. 4 to 6
4. over 6

13. How many hours per week do you spend outside of your home?

1. none
2. 3 to 5 hours
3. 6 to 12 hours
4. 13 to 19 hours
5. over 19 hours

14. How satisfied are you with the overall support you get from other people for dealing with personal or day-to-day problems:

1. very satisfied
2. fairly satisfied
3. a little satisfied
4. not satisfied at all

15. Do you have a confidant, someone you can talk to about issues that concern you?

1. yes
2. no

APPENDIX B: PROJECT 5 DEMOGRAPHIC QUESTIONS

HEF ID#:_____ P01 ID#_____

P01 PROJECT 5: DEMOGRAPHIC QUESTIONS

1. How would you rate your health at the present time? ***(circle one option)***
   1. excellent 2. good 3. fair 4. poor

2. How much do health troubles stand in the way of your doing things you want to do?
   1. not at all 2. a little (some) 3. a great deal

3. Do you think your health is better, the same as, or worse than most people your age?
   1. better 2. same 3. worse

4. Has your health status changed since _____, which was the date of your last visit to the Pennington Biomedical Research Center?
   1. Yes 2. No

If yes, please explain:

_____

_____

_____

_____

5. Have you had a change in your medications since _____, your last visit to the Pennington Biomedical Research Center?
   1. Yes 2. No

If yes, please explain:

_____

_____

_____

_____

6. Have you experienced any major changes in your life, such as a death in the family or selling your home, since _____, your last visit at the Pennington Biomedical Research Center?
   1. Yes 2. No

If yes, please explain:

_____

_____

_____

_____

P01 ID#_____

7. How many clubs or social organizations do you belong to? (include church and other community activities)

1. none
2. 1 to 3
3. 4 to 6
4. over 6

8. How many hours per week do you spend outside of your home?

1. none
2. 3 to 5 hours
3. 6 to 12 hours
4. 13 to 19 hours
5. over 19 hours

9. How satisfied are you with the overall support you get from other people for dealing with personal or day-to-day problems:

1. very satisfied
2. fairly satisfied
3. a little satisfied
4. not satisfied at all

10. Do you have a confidant, someone you can talk to about issues that concern you?

1. yes
2. no

11. Do you have any relatives who have been diagnosed with Alzheimer's Disease? If so, please indicate how this person (or these persons) are related to you (i.e., brother or sister, parent, maternal or paternal grandparent, great aunt-mother's side of the family, cousin, etc.)

_____

_____

_____

_____

_____

_____

APPENDIX C: MINI MENTAL STATE EXAM

INSTRUCTIONS: Place a check above correct answers, as appropriate. Record score for each item in the margin. Total scores will be calculated later.

Assess level of consciousness along a continuum: Alert Drowsy Stupor Coma

ORIENTATION

1. Ask Ss for the date. Then specifically ask for the parts omitted.
(SCORE: 1 point for each) (5) _____

"What is the (year) (season) (date) (month) (day)?"

2. "Can you tell me the name of the: (state) (parish) (5) _____
(town) (hospital/or where we are today) (floor/or room we're in today)?"

(Note: you may use the term, "facility" or "building" instead of hospital
If testing Ss at home, say "where we are today/room we're in today)

REGISTRATION

Tell the Ss that you have a memory task for him/her. Then say the following, clearly and slowly (i.e., 1 second to say each):

3. "Remember these 3 words: cup, pencil, airplane." (3) _____

After you have said all 3, ask Ss to repeat them. Give 1 point for each correct answer. Then repeat them until the Ss learns all 3. Count trials and record. (SCORE: number of words correct on first attempt (0-3). Allow up to 6 trials)

Number of repetitions _____

ATTENTION AND CALCULATION

4. "I want you to count backwards from 100 by 7's." Stop after 5 subtractions (93, 86, 79, 72, 65) (SCORE: 1 point for each correct subtraction of 7 from the previous number).

"Now spell "world" backwards." (SCORE: number of letters in correct order, i.e., DLROW=5; DLORW=3).

Score both tasks, but only count the best one toward the total score (5)
_____**RECALL**

5. "Do you remember the words I gave you earlier? What were they?"
(the 3 objects repeated above. 1 point for each correct) (3) _____

LANGUAGE

6. NAMING. Point to a wristwatch and ask the Ss what it is.
Repeat this for pencil (2) _____

REPETITION

7. As the Ss to repeat the following:
"No ifs, ands or buts." (1) _____

COMPREHENSION

8. (Follow a 3-stage command). Place a piece of paper in front of the Ss and say:
"Take a paper in your right hand,
fold it in half, and put it on the floor." (3) _____

Read and the following and do what it says:
(Have Ss read "close your eyes" on attached sheet. They also need to make up their own sentence. Credit is given for copy a design only if they get all of the angles right).

CLOSE YOUR EYES (1 point)
Write a sentence (1 point)
Copy a design (1 point) (3) _____

TOTAL SCORE: _____

APPENDIX D: GERIATRIC DEPRESSION SCALE

GDS - Short Form **Date _____ ID _____**

*We would like to ask you some questions about how you have felt over the **PAST WEEK**.*
*Please circle **YES** if a statement is true for you and **NO** if it does not apply to you.*

1	Are you basically satisfied with your life?	Yes	No
2	Have you dropped many of your activities and interests?	Yes	No
3	Do you feel that your life is empty?	Yes	No
4	Do you often get bored?	Yes	No
5	Are you in good spirits most of the time?	Yes	No
6	Are you afraid that something bad is going to happen to you?	Yes	No
7	Do you feel happy most of the time?	Yes	No
8	Do you often feel helpless?	Yes	No
9	Do you prefer to stay at home, rather than going out and doing things?	Yes	No
10	Do you feel that you have more problems with memory than most?	Yes	No
11	Do you think it is wonderful to be alive now?	Yes	No
12	Do you feel pretty worthless the way you are now?	Yes	No
13	Do you feel full of energy?	Yes	No
14	Do you feel that your situation is hopeless?	Yes	No
15	Do you think that most people are better off than you are?	Yes	No

APPENDIX E: KNOWLEDGE OF MEMORY AGING QUESTIONNAIRE

LOUISIANA STATE UNIVERSITY MEMORY AGING QUESTIONNAIRE

INSTRUCTIONS. Below you will find a series of statements about memory in adulthood. Think of "younger people" as those in their 20's and 30's, and "older people" as those over age 60. Some of the statements are true and some are false. For each item, indicate in the blank space whether you think the statement is true (T) or false (F). If you are uncertain, then feel free to write “DK” (Don’t Know) in the blank space so that you have an answer for every item below.

1. ____ "A picture is worth a thousand words" in that it is easier for both younger and older people to remember pictures than to remember words.

2. ____ Older people tend to have more trouble concentrating than younger people. That is, older people are more likely to be distracted by background noises and other happenings around them.

3. ____ Regardless of how memory is tested, younger adults will remember far more material than older adults.

4. ____ Confusion and memory lapses in older people can sometimes be due to physical conditions that doctors can treat so that these symptoms go away over time.

5. ____ Becoming disoriented (such as getting lost or losing track of what day it is) happens to persons with Alzheimer's Disease, but only in the later stages of the disease.

6. ____ Older people remember to do future planned activities (such as returning a book to the library) better than they remember past actions that they have already completed.

7. ____ Medications that are prescribed by doctors for heart and circulation problems do not affect memory in older adults.

8. ____ Sometimes the effects of intense grief over the loss of a loved one may be mistaken for early Alzheimer's Disease in older adults.

9. ____ A complete physical exam by a doctor is routinely recommended, if a diagnosis of Alzheimer's Disease is suspected.

10. ____ Older people tend to remember specific past events in their daily life better than they remember the meanings of words (vocabulary) and general facts (such as the capital of the United States).

11. ____ Frequent complaining about memory problems is an early sign of Alzheimer's Disease.

12. ____ The only way to tell for sure if an individual has Alzheimer's Disease is to do an autopsy after that person has died.

13. ____ If an older adult is unable to recall a specific fact (e.g., remembering a person's name), then providing a cue to prompt or jog the memory is unlikely to help.

14. ____ When older people are trying to memorize new information, the way they study it does not affect how much they will remember later.

15. ____ If one has lived to be 85 years old and shows no signs of Alzheimer's Disease, then the chances are very high that this person will live out the rest of his or her life without developing the disease.

16. ____ For older adults, the ability to remember something is unrelated to the number of other thoughts or issues on their mind when trying to recall this information.

17. ____ Memory for how to do well-learned things, such as reading a map or riding a bike, does not change very much, if at all, in later adulthood.

18. ____ Signs and symptoms of Alzheimer's Disease show up gradually and become more noticeable to family members and close friends over time.

19. ____ When an older adult comes in for a checkup, doctors and psychologists can now clearly tell the difference between the symptoms of mental health problems and the symptoms of physical illness.

20. ____ Immediate memory (such as repeating a telephone number) is about the same for younger and older people, but an older person's memory for things that happened days, weeks, or months ago is typically worse than that of a younger person.

21. ____ If an older person has gone into another room and cannot remember what he or she had intended to do there, going back to the place where the thought first came to mind will often help one recall what he or she had intended to do.

22. ____ Alzheimer's Disease is the only illness that leads to confusion and memory problems in older adults.

23. ____ For older people, education, occupation, and verbal skills tend to have little influence on their memory.

24. ____ Modern day memory improvement methods that are based on organization (e.g., grouping similar items together) and association (e.g., linking new information to what is already known) can actually be traced back to the ancient Greek scholars, such as Aristotle and Plato.

25. ____ Healthy older adults have trouble remembering how to use familiar gadgets (like a key chain) and appliances (like a can opener).

26. ____ Dramatic changes in personality and relationships with others may be seen in persons who have Alzheimer's Disease.

27. ____ Memory training programs are not helpful for older persons, because the memory problems that occur in old age cannot be improved by educational methods.

28. ____ Lifelong alcoholism may result in severe memory problems in old age.

APPENDIX F: MEMORY FUNCTIONING QUESTIONNAIRE

Memory Functioning Questionnaire-Revised

INSTRUCTIONS. This is a questionnaire about how you remember information. There are no right or wrong answers. Circle a number between 1 and 7 that best reflects your judgment about your memory. Think carefully about your responses, and try to be as realistic as possible when you make them. Please answer all questions.

General Frequency of Forgetting

How would you rate your memory in terms of the kinds of problems that you have?

major problems			some minor problems			no problems
1	2	3	4	5	6	7

How often do these present a problem for you?

	always			sometimes			never
a. names	1	2	3	4	5	6	7
b. faces	1	2	3	4	5	6	7
c. where you put things (e.g., keys)	1	2	3	4	5	6	7
d. directions to places	1	2	3	4	5	6	7
e. beginning to do something and forgetting what you were doing	1	2	3	4	5	6	7

As you are reading a novel, how often do you have trouble remembering what you have read?

	always			sometimes			never
a. the paragraph just before the one you are currently reading	1	2	3	4	5	6	7
b. the sentence before the one you are currently reading	1	2	3	4	5	6	7

How well do you remember things that occurred?

	very bad			fair			very good
a. between 1 and 5 years ago	1	2	3	4	5	6	7
b. between 6 and 10 years ago	1	2	3	4	5	6	7

HEF ID# _____ LSU ID# _____

Seriousness of Forgetting

When you actually forget in these situations, how serious of a problem do you consider the memory to be?

	very serious			somewhat serious			not serious
a. names	1	2	3	4	5	6	7
b. faces	1	2	3	4	5	6	7
c. where you put things (e.g., keys)	1	2	3	4	5	6	7
d. directions to places	1	2	3	4	5	6	7
e. beginning to do something and forgetting what you were doing	1	2	3	4	5	6	7

Retrospective Functioning

How is your memory compared to the way is was?

	much worse			same			much better
a. 1 year ago?	1	2	3	4	5	6	7
b. 5 years ago?	1	2	3	4	5	6	7
c. 10 years ago?	1	2	3	4	5	6	7
d. 20 years ago?	1	2	3	4	5	6	7
e. when you were 18?	1	2	3	4	5	6	7

Mnemonics Usage

How often do you use these techniques to remind yourself about things?

	always			sometimes			never
a. keep an appointment book	1	2	3	4	5	6	7
b. write yourself reminder notes	1	2	3	4	5	6	7
c. make lists of things to do	1	2	3	4	5	6	7
d. make grocery lists	1	2	3	4	5	6	7
e. plan your daily schedule in advance	1	2	3	4	5	6	7
f. mental repetition	1	2	3	4	5	6	7
g. associations with other things	1	2	3	4	5	6	7
h. keep things you need to do in a prominent place where you will notice them	1	2	3	4	5	6	7

APPENDIX G: MEMORY CONTROLLABILITY INVENTORY

The Memory Controllability Inventory (MCI)
(Courtesy of Lachman, Bandura, Weaver, & Elliott, 1995)

This is a questionnaire about your memory. Please indicate the extent to which you agree or disagree with each statement. Provide the answer that is right for you by filling in the bubble that best describes your beliefs. For example, if you strongly agree with the statement, you would fill in the bubble under strongly agree. If you strongly disagree with the statement, you would fill in the bubble under strongly disagree. If you are neutral, you would fill in the bubble under neutral.

	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
1. There's not much I can do to keep my memory from going downhill.	O	O	O	O	O	O	O
2. I can remember the things I need to.	O	O	O	O	O	O	O
3. I can't seem to figure out what to do to help me remember things.	O	O	O	O	O	O	O
4. No matter how much I use my memory it is bound to get worse as I get older.	O	O	O	O	O	O	O
5. Alzheimer's disease is a common problem among the elderly.	O	O	O	O	O	O	O
6. As I get older, I'll need to rely on others to remember things for me.	O	O	O	O	O	O	O
7. If I work at it, I can improve my memory.	O	O	O	O	O	O	O
8. I'm not good at remembering things.	O	O	O	O	O	O	O
9. If I use my memory a lot, it will stay in shape, just like my muscles do if I exercise.	O	O	O	O	O	O	O

MCI Continued

	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
10. I can find ways to improve my memory.	O	O	O	O	O	O	O
11. When I forget something I am apt to think I have Alzheimer's disease.	O	O	O	O	O	O	O
12. I can't remember things, even if I want to.	O	O	O	O	O	O	O
13. I think there's a good chance I will get Alzheimer's disease.	O	O	O	O	O	O	O
14. If I use my memory often I won't lose it.	O	O	O	O	O	O	O
15. As I get older, I won't have to rely on others to remember things for me.	O	O	O	O	O	O	O
16. I can think of strategies to help me keep up my memory.	O	O	O	O	O	O	O
17. If I want to have a good memory I need to have others to help me remember.	O	O	O	O	O	O	O
18. I sometimes think I have Alzheimer's disease.	O	O	O	O	O	O	O
19. When it comes to memory, there is no way I can make up for the losses that come with age.	O	O	O	O	O	O	O

APPENDIX H: EXAMPLE PMC RESPONSES

Examples of responses for the coding categories for both PMC questions:

PMC bothersome forgetting question example responses for the codes

Obligations/commitments to others:

ID #113 “If I promise somebody I’m going to do something for them and I forget it, you know. I worry about that.”

ID # 121 “Well some of the things that I might tend to forget that bother me are things my wife expects me to do such as making coffee in the morning. That upsets me because I know it bothers her.”

Spatial location information:

ID #104 “Like when you park your car in a shopping center; if you don’t make a mental note to know where your car is…and you can’t find it…that bothers me to come out and not know where your car is.”

ID #117 “I’m bothered when I lose things. I like to know where things are.”

Important dates:

ID #115: “If I forget the date of an appointment.”

ID #105 “I might forget a birthday or an anniversary- something that is important.”

Reported no bothersome forgetting:

ID # 201 “Yeah, I don’t. It doesn’t bother me at all. It may seem weird, but I just don’t really seem to have any problems in the day to day activities types of things.”

ID # 202 “I can’t think of any particular thing, you know, that I forget. I try to make a habit of making some kind of way to remind me of the things that I’m supposed to do.”

Names of people:

ID # 116 “If someone walks up to me and I know your face, but I couldn’t think of your name. I could not remember who you were and I thought of your name an hour later.”

ID # 221 “I’ll name some names things you never expect not to remember and you are maybe more irritated if it is someone that is closer to you than normal.”

To return phone calls, reply to email or letters:

ID # 116 “If there is some specific reason I am supposed to call you back.”

ID # 209 “To remember that I needed to make a phone call to a friend.”

Other:

ID # 304 “It really bothers me when I forget to respond as I should. Of course I try to remember.”

ID # 313 “It bothers me when I forget locking my doors at night.”

To pay bills:

ID # 228 “Things that are important, you know bills you have, which you can’t have otherwise handled.”

ID # 313 “What bothers me is to fail to mail in a bill.”

Other future action:

ID # 339 “It would bother me if I forgot to offer to run to the store or something.”

ID # 109 “To say I am going to do something and but forget to go do it.”

To do household chores

ID # 207 “I am bothered when I forget how to cook and I burn something and have to scrub out the pot.”

ID # 209 “If I forget the heat is on, that bothers me.”

To take medications:

ID # 119 “I think my greatest fear would be to not take my medications.”

ID # 212 “Medication. I am supposed to take it everyday and one once a week.”

Verbatim information:

ID # 104 “If I forget a recipe.”

ID # 334 “When I go out and get something specific it would bother me if I went out and didn’t get those specific things.”

Faces:

ID # 223 “It bothers me when I look at somebody and I know I am supposed to know them, but I really don’t know who they are. It is kind of embarrassing.”

ID # 304 “Forgetting to recognize or remember my relatives and friends.”

Skill-based activities:

ID # 339 “Forget how to drive a car or play the piano.”

ID #342 “If I forget dance steps.”

To engage in a leisure activity:

ID # 106 “If I forgot to go to an LSU football game, I’d get pretty upset.”

ID # 323 “Occasionally there is something I want to watch on TV and then I forget to do it.”

Semantic information:

ID # 117 “It bothers me, like that doctor told me I had one thing, and when I called to ask them what I had, they said I had dermatitis. So I don’t know what I had wrong with that rash. I couldn’t remember dermatitis. If it is a word I hear, then I’ll write it down on paper.”

ID # 315 “If I forget how to spell.”

Temporal orientation information:

ID # 324 “Mostly the time of things.”

ID # 335 “I was quite taken aback when I forgot what date it is.”

PMC Question: Fears about memory aging

Succumbing to disease:

ID # 108 “Alzheimer’s. I think the possibility of Alzheimer’s or dementia is the greatest fear I have. My mother has dementia. Or at least that is what they think it is, they don’t really know.”

ID # 116 “The big A. Alzheimer’s.”

Loss of independence:

ID # 118 “Getting to the point where you can’t function on your own.”

ID # 207 “I guess the most frightening would be that I have reached a place where I could not think independently. I think everybody has that fear, wanting to remain independent.”

Reported no memory aging fears:

ID # 104 “I didn’t come up with anything in thinking about that. And maybe it is because I don’t yet feel a deficiency in it. I’m not frightened yet about aging. In fact, I don’t even think there will be a time where I need to be concerned about that. As it comes to memory, there’s nothing that’s frightening to me at the moment.”

ID # 204 “Nothing real frightening about that.”

Becoming a burden on others:

ID # 205 “I don’t want to be a burden to my family or anybody else.”

ID # 207 “I guess frightening would be that my children would have to take care of me or somebody would have to be responsible.”

Other:

ID # 212 “I have a fear of not knowing anything.”

ID # 117 “Just like I told you about Wanda. I don’t want to be like Wanda.”

Not knowing friends or family:

ID # 114 “Forgettting people that I have been involved with over the years, that is going to be painful if I can’t remember some people that I have thought of as my best friends.”

ID # 121 “I worry about not recognizing people who I used to recognize. It’s embarrassing and sort of frightening to me.”

Forgetting a skill:

ID # 121 “I think probably the most frightening thing is forgetting about work-related activities like income taxes.”

ID # 114 “To lose my ability to teach others because I am forgetting how to teach and the information, that is going to be hard.”

Losing self:

ID # 201 “Not even know who you are. To be completely disconnected.”

ID # 312 “Most important thing is to forget who I am.”

Constraints on social interactions:

ID # 340 “If you remember the conversations you have. My daughter and I are fighting now about a word she said I said, but I still think I didn’t say it.”

ID # 207 “Forgetting whether friends have visited or not.”

VITA

Emily Olinde Boudreaux is a native of Baton Rouge, Louisiana. She received a Bachelor of Arts degree in English 2003 and a Master of Arts degree in psychology in 2006, both from Louisiana State University. During her graduate work at Louisiana State University, she worked under the direction of Dr. Katie E. Cherry, Distinguished Professor of Psychology and Director of the LSU Life Course and Aging Center. Emily's research and clinical interests include cognitive aging and behavior problems of individuals with developmental disabilities. She completed a pre-doctoral internship at Kennedy Krieger Institute and Johns Hopkins University School of Medicine. Emily currently resides in Baltimore, Maryland, where she is completing a post-doctoral fellowship at Kennedy Krieger Institute and Johns Hopkins University School of Medicine.