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The Effect of Age-Related Stereotypes on Memory Self-Efficacy and Memory Task-Performance of Older Adults

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THE EFFECT OF AGE-RELATED STEREOTYPES ON MEMORY SELF-EFFICACY AND MEMORY TASK PERFORMANCE OF OLDER ADULTS

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Forty-six older adults participated in a study to examine the hypothesis that there is a significant association between stereotypes of age-related memory decline and memory self-efficacy beliefs. It was also hypothesized that this relationship affects performance on measures of memory performance. A measure of age stereotype vulnerability was assessed along with two measures of memory self-efficacy, four measures of implicit, explicit, and working memory, and two measures of implicit and explicit sequential learning. Structural equation modeling was used to analyze the relationships among stereotypes of age, memory self-efficacy, and subsequent performance on various tasks of memory and learning. Emphasis was placed on the memory self-efficacy construct as a moderating variable and its utility in examining cognitive behavior in adults. The model hypothesized for this research was not supported.
CHAPTER 1

Introduction

The predominant view of aging as expressed by Americans is that it is a time of inevitable cognitive and physical decline (Kite & Johnson, 1988; Levy & Langer, 1994). Forgetfulness and absentmindedness are considered among the least desirable and the least controllable changes involved in the process of aging (Ryan & See, 1993). In addition, older adults tend to report feeling less of a sense of mastery over their memory abilities than do young people (Hertzog, Dixon, & Hultsch, 1990). However, chronological aging no longer provides a satisfactory explanation for age-related decrements in cognitive performance (Berry, 1989). Although aging is associated with a decline in cognitive functioning, the broad individual variability involved in age-related decline is documented by research (Schaie, 1996; Willis, 1996) with no clear explanations offered as to the factors contributing to this decline. Instead the roles of the individual, the specific task, and the situational variables surrounding both have gained recognition as critical components for understanding cognition in adulthood (Craik, Byrd, & Swanson, 1987).

Given the pervasive stereotype of age-related memory decline and the broad variability found in individual decline, there is disagreement concerning the inevitability of the change in cognitive functioning. Memory researchers suggest that age-related cognitive decline is a function of the deterioration that occurs as a result of the aging
process on the nervous system. Research from this perspective documents the trends in memory decline (Graf & Schacter, 1985; Howard, 1996; Light, 1991; Light & Burke, 1988; Salthouse, 1990, 1996; Schacter & Graf, 1986; Smith & Earles, 1996). Research in social cognition suggests that age-related memory declines are the result of a self-fulfilling prophecy based on stereotypical expectations for one's self. Research from this perspective examines environmental factors considered to be potential mediators of cognitive functioning (Berry, West, & Dennehey, 1989; Cavanaugh, 1989; Cavanaugh & Green, 1990; Hertzog, et al., 1990; Levy, 1996; Levy & Langer, 1994; Seeman, McAvay, Merrill, Albert, & Rodin, 1996).

When memory performance is considered in the context of self-efficacy and age-related stereotypes, questions arise not only about the effect of the aging process on memory performance but also what portion of that effect, if any, can be attributed to the interaction of age-related stereotypes and memory self-efficacy. Research in the area of age-related stereotypes suggests that the effects of stereotypes are extremely salient in both self-perception and in the perception of others (Levy & Langer, 1994; Ryan, 1992; Ryan & See, 1993). Ryan and See (1993) examined the fundamental question of whether age changes in memory anticipated for the general population are also anticipated for oneself. Their findings indicated that beliefs concerning age-related declines in memory are as strong in terms of expectations for oneself as for older individuals in general. These age-based beliefs and expectations can inhibit the development of appropriate memory strategies resulting in an increase in one's own perceptions of memory difficulties and memory performance. In other words, some portion of memory loss associated with aging
may be a function of the individual's belief in the stereotype that memory loss is an inevitable result of the aging process.

In further research, Levy and Langer (1994) examined the effect of a negative age stereotype as a contributor to age-related memory loss and found that the attitude toward, and the perception of, aging within the cultures of the cohorts they examined had a significant influence on the amount of memory differential measured between younger and older adult performance on tasks of implicit and explicit memory. Their results also suggest the contribution of a social influence mechanism to the age-related memory decline accompanying the aging process. Specifically, their findings suggest that the more negative the cultural attitude toward aging, the greater the difference in memory task performance between younger and older adults within that culture. Additionally, studies by Levy (1996) suggest that self-stereotypes of wisdom and senility can be primed in older individuals beneath their awareness levels, and priming these stereotypes can influence both subsequent memory performance and indirect measures of perceptions of aging and memory self-efficacy. Levy also suggests that the influence of implicit self-stereotyping on the memory performance of older individuals appears to be robust. The findings suggest that self-stereotyping affects individuals of diverse experiences and cognitive capabilities and operates as a mechanism in judgments of social groups.

Hertzog et al. (1990) examined the relationships between metamemory, memory predictions, and memory task performance in adults. Their research findings support the hypothesis that memory performance predictions should be viewed as task-specific memory self-efficacy judgments (Berry, et al., 1989; Cavanaugh, 1989). Their findings
also indicate that metamemory scales relating specifically to memory self-efficacy correlate significantly with predictions for both word and text recall, and measures of memory self-efficacy correlate more strongly with memory performance predictions than do general measures of self-efficacy (Cavanaugh, 1996).

Finally, in a study by Seeman et al. (1996) longitudinal data from a large, high functioning cohort was used to examine the hypothesis that baseline self-efficacy beliefs would predict better maintenance of cognitive performance. The study provided a repeated measure of self-efficacy beliefs for the examination of a reciprocal relationship between cognitive performance and self-efficacy beliefs. The goal of their study was to determine whether the specific relationship between stronger instrumental self-efficacy beliefs and better verbal memory performance found in an earlier study (Seeman, Rodin, & Albert, 1993) was replicated with longitudinal data. Their findings suggested that stronger instrumental efficacy beliefs predict better verbal memory performance among males, but not among females. Self-efficacy beliefs did not predict performance in either domain of self-efficacy or the other cognitive domains of nonverbal memory, abstraction, or spatial ability for either gender.

In sum, prior research has consistently demonstrated age-related declines in some aspects of memory, but there is little consensus as yet on the explanations for this decline. Additionally, research on the nature of the relationship between memory performance in old age and memory self-efficacy beliefs has been inconclusive. Currently, the few studies conducted have not established whether self-efficacy beliefs result from inevitable biological decline of certain types of memory or whether these beliefs contribute to the
decline (Light, 1991; Smith & Earles, 1996, Howard, 1996). Given the individual variability of the age-related memory declines, an understanding of the factors contributing to the individual differences becomes critical to providing maintenance of higher levels of cognitive functioning. This study was designed to provide a better understanding of the relationship between age-stereotypes, memory self-efficacy, and memory functioning in adults over the age of 60. It was generally hypothesized that age-related stereotypes influence memory self-efficacy, which in turn influences memory task performance.
CHAPTER 2

Review of the Literature

In light of the current shift in demographics toward an aging population, one of the new challenges in research is understanding the cognitive changes that occur with the aging process, particularly those changes involving memory. Paradoxically, each individual hopes to grow old, but, the aging process is typically approached with fear and dread. Stereotypes of aging produce images of an inevitable decline toward physical and mental mortality. And in actuality, the fact that many people remain physically healthy well into their 80's does not mitigate the risk of age-related memory decline. Additionally, issues of self-efficacy, especially those concerning the ability to maintain independent living status, are dependent upon the maintenance of functional cognitive capacity. The importance of memory stems not just from the storage for one's unique past but also from its basis for examining the present and planning for the future, both essential for structuring behavior patterns. An individual's memory assists in the perception of the world and becomes an indispensable tool in reasoning and solving the daily and routine problems of existence.

Current memory research suggests that some types or processes of memory are spared with age while others are not. Schacter, Kaszniak, and Kihlstrom (1991) found in their review of patterns of age-related memory decline that recall as opposed to recognition memory, explicit as opposed to implicit memory, and episodic as opposed to
semantic memory tend to decline with age. There are several explanations offered for these declines, but there is no consensus on their validity. Hypotheses in the cognition literature suggest that age-related memory decline is a function of fundamental physical and cognitive changes such as a decrease in the amount of time required for processing information (Salthouse, 1992). Other research, however, suggests alternative explanations involving mediating variables such as memory self-efficacy (Light, 1991). Rodin and Langer (1980) argue that because of both current and anticipated changes in their life roles, older adults are particularly vulnerable to social influences and expectations. Lower self-evaluations of memory based in part on age-related stereotypes can lead to reduced memory performance through their indirect impact on decreased effort, less use of adaptive strategies, avoidance of challenging situations, or failure to seek medical attention for disease related symptoms of forgetfulness (Bandura, 1982, 1989; Cavanaugh, 1996). Just as with physical fitness, the concept of "use it or lose it" in this context implies that memory decline is an inevitable result of cognitive inactivity or under-utilization.

Age-Related Changes in Memory

There are several theoretical perspectives on the nature of age-related changes in memory. These perspectives range from the more pessimistic approach implicating irreversible age-related changes in the basic mechanisms underlying cognition to the more optimistic approach implicating inefficient use of encoding and retrieval strategies. Light (1991) indicates in a review of the age-related memory research that the types or processes of memory most affected by age-related decline are those of explicit, episodic, and working memory. Currently there are two major theoretical frameworks used to
depict these age-related memory changes. One attributes age-related memory impairments to changes to specific memory processes or structures (e.g., explicit recollection or episodic memory), while the other attributes these effects to differences in the availability of cognitive resources in working memory. Research in these areas is reviewed briefly because of the inclusion of memory variables in this study.

**Episodic and Explicit Memory**

In recent years, research on age-related memory change has focused on comparisons of implicit and explicit measures of memory. According to Graf and Schacter (1985), the term explicit memory refers to measures that require participants to intentionally retrieve information, whereas implicit memory refers to measures that tap memory without deliberate recollective effort on the part of the participant. Studies of memory have traditionally relied on explicit tests such as free recall, cued recall, and recognition, whose most prominent feature is that they make explicit reference to and require conscious recollection of a specific learning episode. In contrast, implicit memory is inferred through a facilitation in performance from earlier exposure to an event or situation (Graf & Schacter, 1985). When participants are assessed with both implicit and explicit measures of memory, age-related differences are typically observed on explicit measures, while implicit measures demonstrate small or unreliable differences (Light, Singh, & Capps, 1986; Light & Singh, 1987) suggesting that older adults demonstrate memory impairment only when deliberate recollection is required.

Several explanations have been offered for this phenomenon. One alternative suggests that implicit memory tasks require activation of pre-existing memory
representations, while explicit tasks require more elaborative processing of contextual information (Graf & Mandler, 1984). According to this view, activation processes are spared while contextual processing is impaired with increasing age (Light & Singh, 1987; Balota, Duchek, & Paullin, 1989). Because of impaired contextual processing, older adults are less adept at monitoring the sources of information they have received (Johnson, Hashtroudi, & Lindsay, 1993; Lindsay & Johnson, 1989; Schacter, Osowiecki, Kaszniak, Kihlstrom, & Valdiserri, 1994) and are more susceptible to the effects of misleading information, as in illusory correlations (Mutter & Pliske, 1994). Likewise, older adults are more likely to identify a previously viewed face as "famous" when it is encountered at a later time (Dywan & Jacoby, 1990) because they don’t explicitly remember where they saw the face.

A second alternative suggests that aging leads to impairments in self-initiated constructive activity (Craik, 1977). Indirect measures of memory are data-driven and thus require little self-initiated processing, unlike explicit tests which are conceptually-driven and require contextual support. Even when identical cues are used for both implicit and explicit tasks, age-related differences are found in performance on explicit memory tasks (Howard, 1988; Light & Albertson, 1989; Light & Singh, 1987) suggesting that age differences in the recollection process are not eliminated by providing additional environmental support for self-initiated retrieval processes.

The existence of multiple memory systems (Tulving, 1972, 1985; Squire, Knowlton, & Musen, 1993) offers a third alternative. For example, Tulving (1985) proposed that there are three separate but interacting memory systems -- procedural,
semantic, and episodic. Procedural memory contains knowledge of the skills and habits implicated in implicit or unconscious processing, semantic memory contains general knowledge of the world that is context independent, and episodic memory contains context dependent information concerning episodes or events and their relationships. The memory systems approach suggests that only episodic memory sustains age-related impairment, while both semantic memory and procedural memory remain intact (Mitchell, 1989). Regardless of the explanation, prior research consistently suggests that older adults have difficulty with memory tasks involving episodic memory in explicit retrieval processes that require deliberate recollection. In contrast, many implicit measures of memory reveal small or nonexistent age-related differences.

**Working Memory**

Other research suggests that age-related memory impairments are a function of changes in fundamental working memory mechanisms such as reduced working memory capacity, or reduced speed of processing (Salthouse, 1988, 1990), or reduced inhibition (Zacks & Hasher, 1988). The relationships among these three processing mechanisms are complex, making it somewhat difficult to distinguish them from each other.

Research in the area of working memory capacity suggests that age-related constraints on cognitive performance are due to limitations in the storage and manipulation of information (Light, 1991). Basic assumptions for this research are that tasks vary in the extent to which they require processing resources, that resource capacity is finite and stable, and that older adults have fewer processing resources than younger adults. In this context, when simultaneous processing is involved and the difficulty level is
sufficient, the performance of older adults will suffer more than that of younger adults (Light, 1991). In line with this idea, findings by Charness and Campbell (1988) show age-related decrements in the efficiency of performance of sequential operations by older adults, while Salthouse and Mitchell (1989) documented decreases in the ability of older adults to perform mental operations while simultaneously preserving the results of an intermediate operation. According to Light, Zelinski, and Moore (1982), age-related working memory limitations account for the failure of integration of material by older adults across premises in reasoning problems, even with accurate recognition of the premise. Additional research findings involving the manipulation of the complexity of mental operations within a task suggest that older adults are more adversely affected by the increasing task complexity (Salthouse, 1987; Salthouse, Mitchell, Skovronek, & Babcock, 1989).

Slowing response time as a function of aging has also been documented (Salthouse, 1988, 1996; Cerella, 1985, 1990). This slowing is the source of a hypothesis suggesting that the response latencies of older adults are longer than those of younger adults by a constant proportion. Some researchers suggest that the deficits in transmission of network activation suggested by the slower latencies account for certain aspects of age-related memory impairment without raising issues concerning resource capacity. Salthouse (1988) indicates that slower transmission of activation can result in the activation of a smaller number of associated nodes. However, according to Light (1991) empirical efforts to demonstrate that age-related memory decrements are a function of cognitive slowing are inconsistent.
Finally research by Hasher and Zacks (1988) suggests that diminished inhibitory processes rather than a reduced working memory capacity in cognitive slowing might result in age-related impairments for older adults. From this perspective, older adults are more likely to entertain thoughts such as daydreams, personally relevant information, or contextually inappropriate interpretations that interfere with information relevant to a particular goal. Thus, while older adults show poorer recall of perceptual and spatial information than younger adults, they show better memory for thoughts and feelings surrounding an event (Hashtroudi, Johnson, & Chrosniak, 1990). Age-related impairments in memory function are then considered a result of decreased ability to inhibit interference from other stimuli.

**Age-Related Changes in Metamemory**

In its original context, metamemory referred to cognitions about memory, especially knowledge of the memory demands required by different tasks or situations, as well as the strategies used for functioning efficiently in those situations. The domain of metamemory in its current usage also incorporates the concepts of memory monitoring, defined as self-knowledge concerning current memory usage, contents, and states, as well as memory self-efficacy, defined as beliefs about one's own memory abilities (Light, 1991). In their analysis, Cavanaugh and Morton (1988) differentiate generic memory knowledge and memory self-efficacy. The separation of these constructs provides for the possibility that individuals may have extensive and accurate knowledge about how memory functions, but also believe that their ability to perform in a given context is poor. Self-efficacy, which focuses on judgments about one's ability to perform, is also differentiated from personal
control which focuses on the causes of behavior. According to Cavanaugh (1996) self-efficacy is not a passive belief about some theoretical future action, but instead guides a person to behave in certain ways based on that belief. Beliefs about memory are considered important because they influence how well we remember information, and memory self-efficacy is pivotal to understanding the relationship between memory beliefs and memory performance. In other words, individuals maintain certain beliefs about their memory abilities and these beliefs have an important effect in determining how they behave when confronted with tasks of remembering.

Knowledge of Memory

Research in the area of metamemory deficiencies suggests alternatives to those explanations of age-related memory decline offered by pure memory research. From this viewpoint, older adults remember less well as a result of erroneous or deficient beliefs concerning the nature of memory and memory strategies or they are less effective at monitoring their encoding and retrieval processes, or finally, they typically make less spontaneous use of task-appropriate strategies.

Deficient knowledge concerning memory implies that older adults may fail to use appropriate memory strategies because of deficits in their beliefs concerning the extent of the task demands. Regarding this hypothesis, Hultsch, Hertzog, & Dixon (1987) have shown that younger and older adults share a similar belief set concerning the properties of memory tasks, providing little support for the notion of differences between younger and older adults concerning knowledge of memory. Additionally, according to Light (1991), there is no consistent evidence demonstrating less awareness of memory states or
diminished ability for memory monitoring for older adults. Older adults are at least as skillful as younger adults in assessing feelings of knowing (Lachman, Lachman, & Thronesbery, 1979). In sum, the research generally suggests that age-related differences in memory monitoring or deficiencies in knowledge concerning memory are small or non-existent.

Use of deficient strategies implies that older adults use less effective encoding and retrieval strategies through disuse of memory skills, diminished attentional capacity, or a reduced level of mastery or self-efficacy. Current research provides little or no support for the concept of disuse (Gilewski, Zelinski, & Schaie, 1990; Hultsch, et al., 1987). According to this view, older individuals who are experts, and who remain active in their domain of expertise, should demonstrate preservation of memory in that domain. Again research suggests that such preservation does not occur (Charness, 1989; Salthouse, Babcock, Skovronck, Mitchell, & Palmon, 1990). Additionally, research suggests that only small differences exist between older and younger adults on reports of strategy use. Several studies concerning the effects of aging on reported use of strategies in the daily routines of everyday life (Gilewski, et al., 1990; Hultsch, et al., 1987) suggest small or nonexistent differences in reported frequency of strategy use between older and younger adults.

On the other hand, the perspective of diminished capacity, with the resulting reduction in elaborative processing, is supported by some research findings (Burke & Light, 1981; Craik, 1977). The concept of diminished capacity predicts that older adults are less likely to engage in appropriate self-initiated memory strategies due to reduced
attentional capacity (Light, 1991). However, the finding that there are no differences found across age groups in the degree to which semantic cues improve performance on tasks of free recall is incompatible with this idea (Rankin & Hinrichs, 1983). The research of Shaw and Craik (1989) also found no age-related differences in memory performance when words were paired with semantic cues. According to Light (1991), experimental manipulations in encoding and retrieval conditions benefit both younger and older adults to about the same extent. These results argue against differences in strategy usage between age groups.

**Self-Efficacy**

Self-efficacy is defined as the extent to which individuals believe in their ability to mobilize the motivation, cognitive resources, and courses of action needed to exercise control over task demands (Bandura, 1977, 1982, 1989). Self-efficacy theory suggests that behavior is cognitively mediated by the strength of an individual's self-efficacy beliefs (Bandura, 1977). This theory assumes that belief in one's ability to perform influences the type of activities an individual chooses, the level of effort that is expended at these activities, the extent to which an individual will persevere given difficulties, and the thought patterns and emotional reactions experienced as a function of this process (Bandura, 1977, 1989). Individuals exhibiting weak self-efficacy levels tend to narrow their range of activities, expend less effort, and demonstrate less perseverance in those activities undertaken (Bandura, 1977, 1989). In theory, weak self-efficacy leads to impaired task performance in those activities attempted due to higher levels of anxiety, distortions in cognition, and undermined motivation through self-doubt (Bandura, 1989;
Bandura & Wood, 1989; Wood & Bandura, 1989). In the context of cognitive functioning, self-efficacy theory predicts that individuals with weaker self-efficacy beliefs reduce their participation in challenging cognitive activities, as well as demonstrate less effort or persistence when those activities are engaged. The concept of use it or lose it suggests that low self-efficacy produces a pattern of reduced frequency or persistency with challenging cognitive activities, increasing the risk of a decline in cognitive performance.

Cavanaugh (1996) defines memory self-efficacy as a set of beliefs about one's capability to use memory functions effectively in a variety of situations. Perceptions of self-efficacy are not considered reflective of global traits, but are instead variable given different behavior domains (Bandura, 1977). Cavanaugh's (1996) model of memory self-efficacy consists of dynamic and reciprocal relationships that operate as a function of the underlying components of cognitive development level, personality, situational factors, knowledge, self-efficacy, and various feedback and evaluation processes. Individuals engage the evaluative judgments of self-efficacy, outcome expectancies, task demands, generic memory knowledge accuracy, and performance as a function of memory processing. However, according to Cavanaugh, self-efficacy evaluations are central, and heavily influence processing resource allocation, strategy selection, effort, and ultimately the level of performance. Moreover, these evaluations are conducted not on the basis of direct input from generic memory knowledge, but rather the influence of generic knowledge mediated through memory beliefs. This mediation process implies that self-efficacy evaluations are undertaken in specific situations, and are developed through the
use of previously stored information and judgments in addition to information processed from the current situation.

A current area of research is the effect of relationship between memory tasks and self-efficacy levels and beliefs concerning memory abilities and performance. The fact that older adults believe their memory abilities to be poor may produce adverse consequences in actual memory performance. As a result of this interest, several instruments have been developed in recent years in attempts to measure the concept of memory self-efficacy. These include both general measures of knowledge of and attitudes toward memory, such as the Metamemory in Adulthood scale (Dixon & Hultsch, 1983; Hultsch, et al., 1987), or the Memory Functioning Questionnaire (Gilewski, et al., 1990), as well as instruments such as the Memory Self-Efficacy Questionnaire (Berry, et al., 1989), that are more closely related to the prediction of performance in specific situations. Evidence from research with these instruments suggests a reduced sense of mastery on memory tasks with older adults (Dixon, 1989; Light, 1991). Further, there is some evidence to support predictive validity of these memory self-efficacy measures (Berry, et al., 1989; Zelinski, Gilewski, & Anthony-Bergstone, 1990). Light indicates that further research is needed in the evaluation of the effect of lowered levels of self-efficacy on age-related memory impairments to establish causal associations.

Cavanaugh's model of memory self-efficacy predicts that the relation between self-efficacy and performance should vary with the type of task and with prior task experience. The research of Berry et al. (1989) supports this model. Their findings indicate that the relationship between self-efficacy and performance differ as a function of prior task
experience with similar memory activities and actual test experience, particularly in older adults. Current research in self-efficacy theory provides additional support for the concept of domain specificity, in particular for the hypothesized relationship between self-efficacy beliefs and increased cognitive performance in older adults (Berry, et al., 1989). The strongest domain specific relationships are found between specific self-efficacy beliefs concerning cognitive abilities and corresponding performance on measures of intelligence and memory. These results are comparable to more general measures of perceived personal control (Berry, et al., 1989), which also demonstrate significant positive associations with memory performance (Lachman, 1983, 1986, 1991; Lachman & Leff, 1989; McDougall, 1993). Seeman et al. (1993) examined the relationship between the two domains of instrumental and interpersonal efficacy beliefs and memory performance. Findings from their research suggest that instrumental efficacy beliefs are most strongly associated with memory subscales, whereas interpersonal efficacy beliefs were not related to cognitive performance.

As an extension of Cavanaugh's model, Hertzog et al. (1990) found that memory self-efficacy judgments were strong predictors of older adult performance on a first retrieval trial, but were less predictive on subsequent trials. These findings support the concept that memory self-efficacy is mediated through subsequent success or failure experiences. Indeed, Berry and West (1993) have found that older adults with high self-efficacy tend to choose more challenging tasks and persevere longer with those tasks than do people with low self-efficacy. Other findings suggest that older adults' expectations about memory decline can also lead to reduced memory performance through the indirect
impact of decreased effort, reduced use of strategies and adaptive techniques, and avoidance of challenging situations (Ryan, 1992). These expectations may lead to failure to seek medical attention for disease-related symptoms of forgetfulness.

Research in the area of self-efficacy is considered important in adult development and aging for two reasons (Welch & West, 1995). Self-efficacy is influenced by the environment in which an individual resides, since experiences foster either feelings of mastery or dependence, depending on the circumstances involved. Secondly, self-efficacy is influenced by personal factors such as affect and experiences with success or failure and by social factors including stereotypes about abilities (Rodin & Langer, 1980). Given the collective experiences of individuals as they age, including the social influences and expectations of the aging process, the relationship between behavior and self-efficacy beliefs is of particular relevance to older adults.

Age-Related Stereotypes

Stereotypes are cognitive simplifications developed to assist individuals with processing information about the social world (Lippmann, 1929). Rather than cope with the complexity of the world, cognitive simplifications or stereotypes are created to process social information and guide perceptions of others. These stereotypes are useful in that they provide a structure or cognitive schema with which to categorize and classify everyday information, but they can also create difficulties by influencing the manner in which information is perceived, processed, and subsequently used. The intrusion of stereotypes in everyday situations requiring individual judgments can produce phenomenon such as illusory correlations (McConnell, Sherman, & Hamilton, 1994;
Mutter & Pliske, 1994), and difficulties also arise with the use of cognitive schema in judgments concerning individuals belonging to specific populations (Devine, 1989; Devine & Baker, 1991; Devine & Malpass, 1985; Devine, Monteith, Zuwerink, & Elliot, 1991). The use of cognitive schema, or stereotypes, in the context of person judgment can have negative effects because of the tendency to perceive out-groups more negatively than in-groups and the tendency to overemphasize variances between groups, and underemphasize variances among individuals within a group (Brewer, Dull, & Lui, 1981). And finally, stereotyping can produce biased encoding, interpretation, and memory processes that are apt to make the stereotypes even more persistent and resistant to change (Devine, 1989).

Although the majority of research in the area of stereotypes focuses on examining stereotypes of ethnicity (Devine, 1989; Devine & Malpass, 1985) and gender (Kite, Deaux, & Miele, 1991), an area of increasing interest is that of stereotypes of the aging adult. Since the early 1950's, researchers have investigated the beliefs and attitudes that various groups and individuals have toward older adults, theorizing that these beliefs and attitudes influence behavior toward older adults (Tuckman & Lorge, 1952, 1953). Much of the current interest is generated by the widespread belief that in North America, older adults are perceived more negatively than younger adults (Kite & Johnson, 1988). In their study, Kite and Johnson found the existence of a negative stereotypical attitude toward older adults with perceptions of older adults generally as less competent, less attractive, and less mentally acute than their younger counterparts. Recent research has also shown that these attitudes and stereotypes begin early in development. North American children of all ages and from various backgrounds generally have negative concepts about older
individuals (Davidson, Cameron, & Jergovic, 1995). Additionally, current research suggests that misconceptions about older people and aging may influence the behavior and self-defining attitude of the older individuals themselves (Banaji, Hardin, & Rothman, 1993; Levy & Langer, 1994).

Additionally, Simon and Hamilton (1994) examined self-stereotyping and social context. Their research demonstrated that individuals stereotype others in terms of their group membership, and those others are perceived and treated in accordance with the beliefs about their groups. It follows, then, that since all individuals belong to social groups or categories, it is reasonable to assume that one's beliefs about one's own groups also influence self-perception and treatment. The self-stereotyping hypothesis is considered to be a process by which people perceive themselves as prototypical of their group, rather than defined by their individual differences from other members. Their findings also indicated that self-stereotyping is more pronounced for minority members and groups rather than for the majority. Steele and Aronson (1995) also found that individuals in stigmatized groups, including the population of older adults, subscribe to beliefs that denigrate their social group.

Other research indicates that the general population holds a wide variety of beliefs and expectations about older people and that some of these beliefs are inconsistent (Brewer, et al., 1981). For example, wisdom and experience are considered to be positive attributes of aging; however, according to stereotypes, older adults are considered to be both forgetful and foolish. Additionally, recent research indicates that most Americans hold both positive and negative stereotypes of old age, but the negative stereotypes are
more prevalent (Brewer, et al., 1981; Kite & Johnson, 1988; Levy & Langer, 1994). A study by Kite et al. (1991) suggests that stereotypes of older adults are multidimensional and that devaluation of that group may not occur across dimensions equally. Their findings also suggest that despite their complexity, stereotypes of older adults are extremely strong, and in judgments involving the area of competency, older people are generally evaluated more negatively than young regardless of actual performance. A meta-analysis performed by Kite and Johnson (1988) provides further support, suggesting that although beliefs about older adult stereotypes resist simple categorization, an overall negative bias exists.

Recent research has documented that activation of stereotypes can occur unconsciously or automatically (Banaji & Greenwald, 1995; Devine, 1989; Perdue & Gurtman, 1990). For example, Perdue and Gurtman found that negative age stereotypes exist below awareness in young participants, and that both negative and positive age stereotypes exist below awareness in older participants. Additionally, their findings confirmed the hypothesis that negative traits are encoded and retrieved more effectively than positive traits when encountered in association with the construct of "old" persons, thereby suggesting that unintentional age bias schema exist at a basic stage of social perception.

Research supporting old adults' stereotypical perceptions of themselves is documented through a number of studies. In a study by Perry and Thomas (1980) findings suggest that participants expect a significant decline in life satisfaction with age. Additional research by Ryan (1992) examined beliefs about memory changes across the
adult lifespan, documenting age-based expectations concerning a consistent pattern of age-related memory decline across the adult lifespan. Their findings also indicated that older adults anticipated greater memory differences between themselves and both younger and older individuals, suggesting that older adults concerned about their own memory may be more susceptible to stereotypes of age-related memory decline.

Banaji et al. (1993) have shown that even incidental exposure to stereotyped knowledge unconsciously and selectively influences judgment, especially for those individuals whose social category matches the social category of previously exposed information. Further, a study by Banaji and Greenwald (1995) demonstrated that culturally pervasive stereotypes about social groups, whether consciously accepted or rejected by the individual perceiver, may produce stereotyped judgments through the use of unconscious access to stereotypes and, in turn, create associative learning that perpetuates the cycle of stereotyping. In other words, implicit or self-stereotypes are those beliefs about how one should behave that individuals acquire from their environment without conscious awareness, and continue to believe regardless of whether these stereotypes provide benefit or harm to themselves or to their groups.

Implicit activation of a stereotype in relation to others and to oneself implies that information and perceptions categorized for judgment purposes is potentially used heuristically. In old age, cues in our society may activate the stereotype and contribute to memory difficulties as a self-fulfilling prophecy. Giles, Coupland, Williams, and Nussbaum (1992) found that hearing the voice of an older adult can activate the use of age stereotypes, an indication that environmental cues that activate stereotypes may be as
subtle as hearing an older adult speak. Given that context, older adults may make unconscious heuristic judgments concerning themselves, based on social influences and expectations of performance rather than actual performance itself.

**Relationship of Age-Related Stereotypes, Self-Efficacy, and Memory**

As indicated in the literature on age-related stereotypes, collectively Americans of all ages view the time of "old age" as a time in life defined by inevitable cognitive and physical decline (Kite & Johnson, 1988; Levy & Langer, 1994). In particular, older American adults tend to report feeling a lesser sense of mastery over their cognitive functioning and memory abilities than do those individuals who are younger (Hertzog, et al., 1990). Historically, age-related declines were considered a function of the aging process, and were considered to be without recourse. However, chronological age in and of itself no longer provides a satisfactory explanation for the declines in cognitive performance associated with aging (Berry, 1989); recent research has begun to examine the effect of individual variability, the type of memory process or task involved, and various environmental and situational variables that may be mediating factor in older adults cognition (Craik, et al., 1987).

When age-related declines in memory task performance are considered, the question arises as to what portion of this decline can be attributed to age-related stereotypes and self-efficacy beliefs. Recent research on the interactions of age-related stereotypes and memory self-efficacy suggests that these stereotypes are exceedingly salient to individuals (Levy & Langer, 1994; Ryan, 1992; Ryan & See, 1993). However, there has been little research on the nature of the relationship between memory self-
efficacy beliefs and memory performance in old age, and the few studies that have been conducted have not established whether self-efficacy beliefs result from inevitable biological decline of certain types of memory or whether these beliefs contribute to the decline (Light, 1991; Smith & Earles, 1996; Howard, 1996).

Ryan and See (1993) examined the fundamental question of whether age changes in memory anticipated for the general population are also anticipated for oneself. Their hypothesis was based on the premise that older adults’ beliefs about aging memory could affect the likelihood of strategy use and consequent memory performance by influencing self-efficacy beliefs. Their findings indicated that beliefs concerning age-related declines in memory are as strong for oneself as for other older individuals in general. Beyond the most direct application of perception of memory losses in others, these findings suggest age-based beliefs could effect one’s own perceptions of age-related memory difficulties and memory performance. In other words, some level of memory loss from aging is potentially a function of the individual’s belief in the age stereotype that memory loss is inevitable as a function of the aging process.

Levy and Langer (1994) examined the effect of a negative age stereotype in terms of contribution to memory loss in old age. In this study, the researchers used episodic recall tasks that primarily assessed explicit memory to examine memory processes in older adults from three cultures: that of American mainstream, American Deaf, and Chinese. The American Deaf and Chinese cultures are considered less exposed to negative stereotypes prevalent in the culture of the American mainstream. They hypothesized that if memory loss in old age was determined only by a biological mechanism of decay, the older
adult populations of the American Deaf and Chinese cultures would not be expected to demonstrate better memory skills than those of the American mainstream. Using path analysis to study whether views of aging influence memory performance in old age, Levy and Langer (1994) found that the influence of culture on memory performance was mediated by the attitude toward, or stereotypes of, aging. There were no significant differences in performance between the young and old participants from the Chinese culture, even though types of memory tasks selected were those for which there is documented age-related decline (Howard, 1996; Light, 1991; Smith & Earles, 1996). In the American Deaf participants, there were significant differences in performance, but not to the extent found in the American mainstream participants. The results thus suggest that a social influence mechanism contributes to the age-related memory decline that accompanies aging. The more negative the cultural attitude toward aging, the higher the measure of memory differential between younger and older adults within that culture.

In a study by Levy (1996) findings suggest that self-stereotypes of wisdom and senility can be primed in older individuals beneath their awareness levels, and that priming these stereotypes can increase or decrease subsequent memory performance through their influence on indirect measures of perceptions of aging and memory self-efficacy. Priming that involves positive images of aging tend to increase subsequent memory performance, while negative images tend to decrease performance. Levy also indicates that the influence of implicit self-stereotyping on the memory performance of older individuals appears to be robust; because the change in performance occurred regardless of sex, education, mood, location of residence, previous computer experience, or age of the older participants.
A study by Hertzog et al. (1990) examined the relationships between metamemory, memory predictions, and memory task performance in adults. Memory predictions are thought to be a measure of memory self-efficacy. Their study used structural regression models to examine the nature and degree of the relationship between these variables. The focus of this study was to model individual differences in these variables using the memory tasks of free recall for words and free recall for narrative texts. Metamemory, including predictions about memory performance, was measured using scales from the Metamemory in Adulthood and Memory Functioning Questionnaire Scales. The research findings supported the idea that memory predictions should be viewed as task-specific memory self-efficacy judgments (Berry, et al., 1989; Cavanaugh, 1989). Their findings also indicated that metamemory scales relating specifically to memory self-efficacy correlated significantly with predictions for both word and text recall. Additionally, measures of memory self-efficacy correlated more strongly with memory performance predictions than did general measures of self-efficacy, supporting the construct of domain specificity in efficacy measures (Cavanaugh, 1996).

In a study by Seeman et al. (1996) longitudinal data from a large, high functioning cohort of older adults were examined to determine whether the hypothesis that baseline self-efficacy beliefs would predict better maintenance of cognitive performance over a 2.5 year period. The study provided a repeated measure of memory self-efficacy beliefs, allowing for the possibility of examining a reciprocal relationship between cognitive performance and the measured self-efficacy beliefs. The study used structural equation modeling to examine causal linkages between instrumental and interpersonal self-efficacy
beliefs and four domains of cognitive functioning: verbal and nonverbal memory, abstraction, and spatial ability. The goal of the study was to determine whether the specific relationship between stronger instrumental self-efficacy beliefs and better verbal memory performance in older adults found in an earlier study (Seeman, et al., 1993) would replicate in the longitudinal data, thus demonstrating greater evidence for causality. The findings suggested that stronger instrumental efficacy beliefs predict better verbal memory performance among males. However, self-efficacy beliefs did not predict performance in either the instrumental or interpersonal domains of self-efficacy, or the other cognitive domains of nonverbal memory, abstraction, or spatial ability for either gender. The authors noted that this pattern parallels the earlier findings (Seeman, et al., 1993) indicating that instrumental efficacy beliefs were most strongly related to the men's performance on tests of verbal memory. In contrast to previous research that has generally not found evidence for such longitudinal prediction of cognitive performance, this study also provides evidence for a significant, longitudinal association between instrumental self-efficacy beliefs and change in verbal memory performance (Grover & Hertzog, 1991; Lachman, 1983; Lachman & Leff, 1989).

The research reviewed presents a pessimistic perspective in that memory capabilities of older adults can be damaged by self-stereotypes derived from culturally pervasive stereotypes about aging. Specifically stated, the stereotype that age-related memory decline is inevitable can become a self-fulfilling prophecy. The more optimistic perspective offered from these findings suggests that age-related memory decline is perhaps not inevitable and that memory performance can be improved. The latter idea is
especially relevant, since cognitive fitness is considered a high priority among older adults (Hatfield & Hatfield, 1992; Ponzo, 1992; Schulz & Heckhausen, 1996).

**Current Research**

Prior research has demonstrated an age-related decline in some aspects of memory; however, there has been little consensus on an explanation for this decline. Moreover, decline in cognitive functioning does not appear to be a uniform process. There are broad individual differences in both the rate and timing of changes and the types of memory affected (Schaie, 1996; Willis, 1996). Some individuals exhibit declines while others continue to demonstrate high levels of cognitive functioning as they age (Lachman & Leff, 1989; Schaie, 1996; Willis, 1996). Given this variability of decline, gaining a better understanding of the factors contributing to the individual differences in age-related declines in cognitive functioning becomes critical to the development of interventions for the maintenance of higher levels of cognitive functioning.

The present study represented an attempt to extend the research in the area of cognitive self-efficacy and memory performance in an aging population by examining the relationships among age-related stereotypes, memory self-efficacy, and performance on memory tasks. Prior research suggests that implicit activation of stereotypes, including age-related stereotypes, influence not only judgments about others but also judgments about one's self (Banaji & Greenwald, 1995; Greenwald & Banaji, 1995). Additionally, research suggests that there is a relationship between memory self-efficacy and memory task performance (Hertzog, et al., 1990). The present study was an attempt to assess the causal relationship between these variables and memory in older adults.
The study specifically focused on measures of working, implicit, and explicit memory, the effect of age stereotypes on memory self-efficacy levels, and their subsequent effect on performance of various tasks of memory and cognitive functioning. Prior research in this area has incorporated measures of cognitive functioning that address specific types of recall such as immediate, learned, delayed, photo, and auditory (Levy, 1996), or measures of verbal and nonverbal memory, abstraction or executive functioning, spatial ability, and language (Seeman, et al., 1996). The present research extended this area of study to working memory, implicit and explicit memory and sequential learning using multiple standardized measures not used in previous research.

Two measures of memory self-efficacy are used in the current study. As recommended by Cavanaugh (1996), the Memory Functioning Questionnaire (Gilewski, et al., 1990) was used as a measure of predictions for remembering, and the Memory Self-Efficacy Questionnaire (Berry, et al., 1989) was used as a measure of the frequency of memory complaints. Additionally, two measures of age-related stereotypes were used. These were the Palmore's Facts on Aging Quiz and Facts on Aging and Mental Health (Palmore, 1988). The Facts on Aging Quiz has been used as measure of stereotype vulnerability in a only one prior study (Levy & Langer, 1994). It was expected that there would be a significant relationship between age-related stereotypes and memory self-efficacy, as well as a significant relationship between memory self-efficacy and memory task performance.
CHAPTER 3

Method

Participants

Forty-six individuals living in the Tennessee and Kentucky area participated in the study. Participants were solicited from the database of older adult volunteers maintained in the Cognition Lab at Western Kentucky University. This database consists of older adult volunteers solicited through the use of advertisements and fliers, and through contact with local churches, elderhostels, independent living residences, and senior centers. Criteria for participation in the study included being age 60 or older, and having the ability to read and write in English, generally good health, and an independent living status. This personal data and other demographic information was obtained from all participants through the use of a biographical questionnaire (see Appendix A). Demographic information included gender, age, years of education, socioeconomic status, use of medication, and current state of health. The age of the participants in this research ranged from 60 to 92, with an average age of 70.9. Of the 46 participants, 20 were males, 26 were females, 45 were European American, and 1 was Asian. Additionally, 34 were married, 2 were single, 2 were divorced, and 8 were widowed. The average level of education was 15.4 years. Upon completion of the assessments, subjects were debriefed as to the nature of the study and were paid $5 for their participation.
Materials and Instrumentation

The primary variables of interest in this study were social influence, including measures of age-related stereotype vulnerability and memory self-efficacy, and memory performance, including, working, implicit, and explicit memory, as well as additional measures of intelligence and executive functioning.

Social Influence Variables

The social influence component of this study was comprised of two variables identified as memory self-efficacy and age-related stereotype vulnerability. The two measures of memory self-efficacy used were the Memory Functioning Questionnaire (Gilewski, et al., 1990) and the Memory Self-Efficacy Questionnaire (Berry, et al., 1989). Each of these scales represents different perspectives of memory self-efficacy that are known to result in varying patterns of self-evaluation (Cavanaugh, 1987). The Memory Functioning Questionnaire is a measure of frequency of memory complaints containing 64 items identifying 4 factors rated on a 7-point Likert scale (see Appendix B). Higher scores on this test indicate a more positive self-evaluation of memory. Reliability for the four factors of the MFQ are reported at .94, .94, .89, and .83, indicating that the factors are highly reliable (Gilewski, et al., 1990). The Memory Self-Efficacy Questionnaire, focuses on confidence levels concerning remembering routine daily items such as grocery lists, phone numbers, and location directions (see Appendix C). Ten different memory tasks are presented at five different difficulty levels each, and participants must indicate their estimate of their performance ability for each by circling the appropriate answer. A positive response requires an estimate of the degree of confidence of successful
completion. Two measures are derived from this questionnaire, one a reflection of an individual's assessment of their basic memory skill level and the other an average confidence rating across the specific tasks. Reliability for the two measures of the MSEQ are reported at .90 for the estimate memory skill level and .92 for the confidence rating (Berry, et al., 1989).

Palmore's (1988) Facts on Aging Quiz (FAQ) and Facts on Aging and Mental Health Quiz (FAMHQ) were used as measures of age-related stereotype vulnerability (see Appendix D). Reliability for each of these instruments is reported at between .70 and .80 (Palmore, 1988). Each of these instruments contains 25 items designed to cover the basic physical, mental, and social facts concerning the aging process, along with the most common misconceptions. The instruments were combined into one assessment instrument for administration purposes, but scored as separate measures of stereotype vulnerability. The items required either a true or false response and the percentage of questions answered incorrectly was considered to be a measure of vulnerability to age stereotypes. Each of these social influence instruments was administered using pencil and paper. Research participants were encouraged to answer all questions as best they could.

Memory

Memory functioning was assessed through the use of several different tests, including a test of working memory (Salthouse & Babcock, 1990), tests of implicit and explicit memory (Graf & Schacter, 1985), and tests of implicit and explicit sequential learning (Howard & Howard, 1992; Mutter, Howard, Howard, & Wiggs, 1990; Nissen & Bullemer, 1987).
The Reading Span Task (Salthouse & Babcock, 1990) was used as the measure of working memory. For this test, participants were seated in front of a computer terminal, and instructions for this task were presented both on the computer screen read orally. Participants were then presented with a series of three sets of sentences. In the first level, each set contained a single sentence, such as "After dinner the chef prepared dessert for her guests." In the second level, for each set participants were instructed to remember the last word of each sentence. After viewing each set, participants were required to answer a multiple choice question testing comprehension of the sentences within the set, while attempting to remember the final word from each sentence. After answering the multiple choice questions in each set within each level, the participants were prompted to verbalize the remembered words. Both the answer to the multiple choice question and the last word in each sentence had to be correct to receive credit for a set, and two out of three set responses had to be correct to receive credit for that level of the test.

The test of implicit and explicit memory was identical to the one used by Graf & Schacter (1985) to examine implicit and explicit memory for new associations. Participants were presented with a series of stimulus-response word pairs (e.g., ripe - apple) and instructed to read each of the two words aloud and construct a sentence using the two words in a meaningful way. Participants were also instructed to rate the difficulty of constructing the sentence. Implicit memory was assessed with a word completion test in which the stimulus and the first three letters of the response words were presented. Participants were asked to complete the stimulus with the first word that came to mind. There were two measures of implicit memory. An implicit associative memory measure
was derived from the difference between the number of correct responses on items presented for recall with the same cue as in the study session and the number of correct responses on items presented with a different study cue. The implicit item memory measure was derived from the difference between the number of correct responses on items presented for recall with the same cue as the study session and the number of correct responses on items presented with cues not in the study session. Explicit memory was examined through the use of a traditional cued-recall test in which the stimulus member of each word pair was presented and the participants were asked to deliberately remember the response word. There were two measures of explicit memory: cued recall with a complete stimulus word cue and cued recall with a fragment of the stimulus word cue.

The test of sequential learning (Howard & Howard, 1992; Mutter, et al., 1990; Nissen & Bullemer, 1987) was a four-choice serial reaction time task. Participants were seated at a computer and asked to observe a series of asterisks appearing sequentially in one of four boxes. They were then instructed to watch for the asterisk in the display, and to press the response key corresponding to the box in which the asterisk appeared as rapidly as possible. Sequential learning blocks were presented in a sequence of four patterned learning blocks, followed by one random block, then again four patterned learning blocks, followed finally by one generation block. The generation block required the participant to predict the box in which the asterisk would appear. Implicit assessment of sequential learning was measured by subtracting response time on the pattern sequence blocks from the random block presentation. If response time was faster on the pattern blocks than on the random blocks, then the pattern was assumed to have been learned.
The percentage of correct predictions from the generation block provided a measure of explicit sequential learning because participants could only perform well on this task by deliberately recalling the earlier pattern sequence.

**Intelligence and Executive Functioning**

Several assessments of intelligence and abstraction, both standardized and experimental, were used. The FAS Verbal Fluency Task (Miller, 1984), a measure of verbal intelligence, required the participant to verbalize as many words as possible, in separate one minute trials, for the letters F, A, and S. Participants were instructed not to use proper names of people or places, and not to repeat a word or to use an alternate form of a word. Violations of these instructions were corrected once during each trial if necessary. The order of the letters was administered consistently across subjects, and responses were audiotaped for scoring purposes. Participant were scored on the total number of words given across the three trials minus the total number repetitions and elaborations.

The Digit Symbol subtest of the Wechsler Adult Intelligence Scale, Revised (Wechsler, 1981) was used as a measure of processing speed. This test required the participants to record the appropriate symbols below a series of numbers using a number symbol code key. The objective of the test was to accurately record as many of the symbols as possible within the timed allowed. Speed of processing was assessed based on the number of correct symbol transfers. The Mill Hill Vocabulary (Raven, Raven, & Court, 1985) was used to assess verbal intelligence. The version used consisted of a paper and pencil test providing a series of vocabulary stimuli each with six multiple choice
responses. This test was not timed, and scores were derived from the number of correct responses.

The Wisconsin Card Sorting Task (Grant & Berg, 1993), a measure of cognitive and neuropsychological functioning, required that participants sort stimuli cards according to the three concepts of color, form, and number. Participants were presented with four key stimuli cards, and were then instructed to match each of the subsequent response cards to one of these four key cards. They were informed that they could not be given specific instructions about how to match the key cards, but would be informed whether each of their match choices was either right or wrong. There were two measures obtained from this test. The first was the number of categories achieved, derived from the number of categories the participants correctly acquired. The second measure was the number of perseverative errors committed, defined as the number of times that a participant continued to sort to a category that was no longer correct or to a category that was initially incorrect.

Procedure

This study required two sessions of approximately one to one-half hour each for each participant. Both sessions were conducted on an individual basis in the Cognition Lab at Western Kentucky University. The lab provided a quiet room with two work tables and a computer. All instructions were administered orally to each of the participants. The participants were informed that the tests involved in this research measured motor, memory, and attention skills. To avoid tiring the older participants, a five minute break was given at approximately the midpoint of each session. During the first session, the
participants first completed the informed consent form (see Appendix E) explaining their rights as a participant in the study. They then completed the study session for the test of implicit and explicit memory, followed by the learning blocks of the test of sequential learning. The participants were then administered the MSEQ and MFQ questionnaires and the Digit Symbol subtest of the WAIS-II. Following these three test items, they then completed the prediction block of the sequential learning test. The final tasks in the first session were the tests of implicit and explicit memory. At the end of this session, appointments were scheduled for the second session to administer the remaining questionnaires and tasks of cognitive functioning and memory.

In the second session all instructions were again administered orally to participants. This session began with the FAS Verbal Fluency Task (Miller, 1984), followed by the Reading Span Task (Salthouse & Babcock, 1990), and the Wisconsin Card Sorting Task (Grant & Berg, 1993). The participant then completed the biographical questionnaire and signed the appropriate paperwork for payment. After a 5 minute break, the participants completed the Mill Hill Vocabulary assessment (Raven, Raven, & Court, 1985), followed by the FAQ/FAMHQ (Palmore, 1988) questionnaire. Upon completion of all testing, participants were debriefed as to the nature of the study.
CHAPTER 4

Results

The memory self-efficacy variables in this research were represented by a measure of forgetting from the MFQ (Gilewski, et al., 1990) and two measures of memory confidence from the MSEQ (Berry, et al., 1989). The first of the two measures of memory confidence represented an individual’s assessment of his or her basic memory skill level based on the number of positive responses. The second measure was a reflection of an average confidence rating across the specific tasks. The FAQ and FAMHQ (Palmore, 1988) were used as measures of age-related stereotype vulnerability. The percentage of questions answered incorrectly was considered a measure of vulnerability to age stereotypes.

There were four memory variables represented in this research. The first of these was working memory, represented by the number of levels of the Reading Span task (Salthouse & Babcock, 1990) for which the participant was able to provide correct responses. The second variable was speed of processing, measured by the Digit Symbol subtest of the Wechsler Adult Intelligence Scale, Revised (Wechsler, 1981). This test evaluated speed of processing based on the number of correct symbol transfers.

Four scores, two implicit and two explicit, were derived from tests of implicit and explicit memory (Graf & Schacter, 1985). The implicit associative associative measure
was derived from the difference between the number of correct responses on items presented for recall with the same study cue and the number of correct responses for items presented with a different study cue. The implicit memory measure was derived from the difference between the number of correct responses for items presented for recall with the same study cue and the number of correct responses for items presented with cues not in the study session. Explicit memory was examined through the use of a traditional cued-recall test in which the stimulus member of each word pair was presented and the participants were asked to deliberately remember the response word. There were two measures of explicit memory recorded -- cued recall with a complete word cue and cued recall with a partial or fragment cue.

The sequential learning task (Howard & Howard, 1992; Mutter, et al., 1990; Nissen & Bullemer, 1987) provided a measure of implicit and explicit sequential learning. For the implicit assessment, the response time on the pattern sequence blocks was compared with the random block presentation. If response time was faster on the pattern blocks than on the random blocks, then the pattern was assumed to have been learned. For the explicit measure, a generation test was presented in which the participants were asked to predict the appearance of the asterisk based on their earlier experience with the sequence. The percentage of correct predictions provided a direct measure of pattern learning by requiring deliberate recollection of the earlier pattern sequence.

It was generally hypothesized that vulnerability to age-related stereotypes influenced memory self-efficacy, which in turn effected memory task performance. The specific hypothesis predicted a significant relationship between age-related stereotypes and
memory self-efficacy levels, a significant relationship between memory self-efficacy and memory task performance, and that memory self-efficacy would act as a moderating variable between vulnerability to age-related stereotypes and memory task performance. To investigate the effects of this hypothesis, a structural equation model was developed and evaluated with the use of AMOS 4.0 (Arbuckle, 1997). The structural equation model as developed is presented in Figure 1. According to this model, the manifest variable vulnerability to age-related stereotype affects the manifest variable measuring memory self-efficacy, which in turn affects the manifest variable of memory task performance. According to the model, memory performance is not directly affected by stereotype vulnerability, but rather the effect is mediated through memory self-efficacy.

Correlations

Intercorrelations of the variables associated with implicit and explicit memory and sequential learning are reported in Table 1. The largest significant correlation occurs between the two explicit memory variables ($r = .502, p < .001$). The explicit fragment cue memory variable was also negatively correlated with the implicit item measure ($r = -.303, p < .05$). The explicit memory fragment cue was correlated with explicit sequential learning ($r = .406, p < .01$) and implicit sequential learning ($r = .331, p < .01$). The both the explicit and implicit sequential learning tasks were positively correlated ($r = .517, p < .001$).
Figure 1. Representation of the original hypothesized model that age-related stereotypes affect memory self-efficacy and subsequent memory task performance.
<table>
<thead>
<tr>
<th>Measure</th>
<th>1</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Implicit Associative Memory</td>
<td>--</td>
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<tr>
<td>2. Implicit Item Memory</td>
<td>-.303*</td>
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<tr>
<td>3. Explicit Memory Complete Word Cue</td>
<td>.155</td>
<td>-.115</td>
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<tr>
<td>4. Explicit Memory Fragment Word Cue</td>
<td>.363**</td>
<td>-.062</td>
<td>.502***</td>
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</tr>
<tr>
<td>5. Explicit Sequential Learning</td>
<td>.146</td>
<td>-.033</td>
<td>.233</td>
<td>.406**</td>
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<td></td>
</tr>
<tr>
<td>6. Implicit Sequential Learning</td>
<td>.148</td>
<td>-.161</td>
<td>.085</td>
<td>.331**</td>
<td>.517***</td>
<td>--</td>
</tr>
</tbody>
</table>

* p < .05. ** p < .01. *** p < .001
Intercorrelations of the variables associated with the variables of age-related stereotype vulnerability, memory self-efficacy, working memory and speed of processing are reported in Table 2. The largest significant correlation occurs between the assessment basic memory skill level and an average memory self-efficacy confidence rating ($r = .828$, $p < .001$). The memory self-efficacy measure associated with forgetting is correlated with both self-efficacy measures of memory skill and confidence levels at ($r = .457$, $p < .001$) and ($r = .375$, $p < .01$), respectively. The two measures of age-related stereotype vulnerability are correlated at ($r = .412$, $p < .01$). Speed of processing is negatively correlated with both measures of age-related stereotypes ($r = -.329$, $p < .05$, $r = -.340$, $p < .01$), and positively correlated with self-efficacy measures of memory skill and confidence levels ($r = .331$, $p < .05$, $r = .225$, $p < .05$).

Intercorrelations of the variables associated with the variables of implicit memory and sequential learning tests are reported in Table 3. The implicit associative measure is positively correlated with both self-efficacy measures of memory skill and memory self-efficacy confidence levels ($r = .299$, $p < .05$, $r = .362$, $p < .05$). The explicit measure of sequential learning is positively correlated with speed of processing ($r = .331$, $p < .05$), and the implicit item measure is positively correlated with working memory ($r = .264$, $p < .05$).
Table 2

Intercorrelations for Social Influence Variables and Working Memory Variables

<table>
<thead>
<tr>
<th>Measure</th>
<th>1</th>
<th>2</th>
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<tbody>
<tr>
<td>1. FAQ</td>
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<td>2. FAMHQ</td>
<td>.412*</td>
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<tr>
<td>3. MSEQ - Skill Level</td>
<td>-.214</td>
<td>.056</td>
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<td></td>
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<td></td>
<td></td>
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<tr>
<td>4. MSEQ - Confidence</td>
<td>-.243</td>
<td>.062</td>
<td>.828***</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. MFQ - Forgetting</td>
<td>-.196</td>
<td>-.098</td>
<td>.457***</td>
<td>.375**</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Speed of Processing</td>
<td>-.329*</td>
<td>-.340**</td>
<td>.331*</td>
<td>.265*</td>
<td>.140</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>7. Working Memory</td>
<td>.029</td>
<td>-.326*</td>
<td>.101</td>
<td>.110</td>
<td>.068</td>
<td>.340**</td>
<td>--</td>
</tr>
</tbody>
</table>

* $p < .05$. ** $p < .01$. *** $p < .001$
# Table 3

**Intercorrelations Between Memory Variables and Social Influence Variables and Working Memory Variables**

<table>
<thead>
<tr>
<th>Measure</th>
<th>FAQ</th>
<th>FAMHQ</th>
<th>MFQ - Forgetting</th>
<th>MSEQ - Skill Level</th>
<th>MSEQ - Confidence</th>
<th>Digit Symbol</th>
<th>Reading Span</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Implicit Associative Memory</td>
<td>.034</td>
<td>.096</td>
<td>.299*</td>
<td>.362**</td>
<td>-.054</td>
<td>.050</td>
<td>.028</td>
</tr>
<tr>
<td>2. Implicit Item Memory</td>
<td>.163</td>
<td>.235</td>
<td>.149</td>
<td>.166</td>
<td>.166</td>
<td>.150</td>
<td>.042</td>
</tr>
<tr>
<td>3. Explicit Memory Complete Word Cue</td>
<td>-</td>
<td>-.196</td>
<td>.112</td>
<td>.076</td>
<td>.032</td>
<td>.035</td>
<td>.060</td>
</tr>
<tr>
<td>4. Explicit Memory Fragment Word Cue</td>
<td>-</td>
<td>-.230</td>
<td>.171</td>
<td>.194</td>
<td>-.057</td>
<td>.147</td>
<td>.193</td>
</tr>
<tr>
<td>5. Explicit Sequential Learning</td>
<td>.004</td>
<td>-.122</td>
<td>.116</td>
<td>.183</td>
<td>-.068</td>
<td>.331*</td>
<td>.205</td>
</tr>
<tr>
<td>6. Implicit Sequential Learning</td>
<td>-</td>
<td>-.090</td>
<td>.005</td>
<td>.095</td>
<td>-.023</td>
<td>.172</td>
<td>.264*</td>
</tr>
</tbody>
</table>

* p < .05. ** p < .01. *** p < .001
Factor Analysis

Given the number of measures for each variable and the sample size, composite scores were derived to represent each manifest variable of interest. The specific research measures of interest included two measures of age-related stereotype vulnerability, three measures of memory self-efficacy, one measure each for speed of processing, working memory, and implicit and explicit sequential learning, and two measures each for implicit and explicit memory. To allow for conceptually meaningful analysis, the data were statistically abstracted by means of a principal components factor analysis with an orthogonal rotation. The factors were allowed to correlate to reflect the underlying assumption about the relationships among the constructs. The eigenvalues, factor loadings, and conceptual clarity of the rotated factors determined the choice of the solution used for subsequent statistical analyses. During the data collection process, measures of executive functioning were also taken. These measures consisted of the FAS verbal fluency task (Miller, 1984), the Mill Hill vocabulary assessment (Raven, Raven, & Court, 1985), and the Wisconsin Card Sorting task (Grant & Berg, 1993). However, these measures did not contribute in a meaningful fashion to the factor model. Subsequent analysis was conducted without the use of these measures.
Table 4

**Factor Scores for Varimax-Rotated Five-Factor Solution**

<table>
<thead>
<tr>
<th>Component</th>
<th>Factor loading</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>FAQ</td>
<td>-.275</td>
</tr>
<tr>
<td>FAMHQ</td>
<td>.132</td>
</tr>
<tr>
<td>MSEQ - Skill Level</td>
<td>.922</td>
</tr>
<tr>
<td>MSEQ - Confidence</td>
<td>.899</td>
</tr>
<tr>
<td>MFQ - Forgetting</td>
<td>.600</td>
</tr>
<tr>
<td>Speed of Processing</td>
<td>.340</td>
</tr>
<tr>
<td>Working Memory</td>
<td>.604</td>
</tr>
<tr>
<td>Implicit Associative Memory</td>
<td>.334</td>
</tr>
<tr>
<td>Implicit Item Memory</td>
<td>.266</td>
</tr>
<tr>
<td>Explicit Memory Complete Word Cue</td>
<td></td>
</tr>
<tr>
<td>Explicit Memory Fragment Word Cue</td>
<td>.104</td>
</tr>
<tr>
<td>Explicit Sequential Learning</td>
<td>.751</td>
</tr>
<tr>
<td>Implicit Sequential Learning</td>
<td>.755</td>
</tr>
</tbody>
</table>

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 9 iterations.
A principle components factor analysis with varimax rotation was used to reduce the number of measures to interpretable composites. The rotated factor solution accounted for 70.43% of the total variance, with each factor representing one of the hypothesized variables. Table 4 provides a summary of the items constituting each factor along with their factor loading. Factor 1 is Memory Self-Efficacy and accounts for 18.67% of the common variance. This factor was comprised of self-efficacy skill level rating, average self-efficacy confidence levels, and the average frequency of forgetting. Factor 2 is Working Memory, Speed of Processing, and Sequential Learning and accounts for 15.54% of the common variance. This factor was comprised of scores representing speed of processing, working memory, implicit sequential learning, and explicit sequential learning. Factor 3 represents Age-Related Stereotype and accounts for 13.21% of the variance. This factor was comprised of the scores representing stereotype vulnerability. Factor 4 represents Explicit Memory Performance and accounts for 12.02% of the variance. This factor was comprised of two explicit memory measures, complete word cue and fragment word cue. And Factor 5, representing Implicit Memory Performance accounts for 10.99%. This factor was comprised of implicit associative and implicit item scores.

**Structural Equation Model**

Following the determination of the most conceptually parsimonious factor model, the data was analyzed to calculate standardized scores and to abstract unrotated factor scores to be used as manifest variables for path analysis in the structural equation model. In this analysis, parameter estimates were obtained for the model using the maximum
likelihood option of AMOS. Goodness of fit for the model was evaluated with the chi square statistic, a measure of the difference between the predicted and observed covariance matrices. Fitting the model of Figure 1 by means of maximum likelihood estimation to the variances and covariances among the variables resulted in a significant chi square, $\chi^2(6, N = 46) = 13.297$, $p = .039$, indicating the model did not support the hypothesized relationships. The goodness-of-fit index was .899, and the standardized root-mean-square residual was .164. While the overall model did not support the hypothesized relationships, there was a statistically significant path between memory self-efficacy and implicit memory performance.

A revision of the model was undertaken, guided by both conceptual and statistical criteria. Of greatest importance was retaining the concept of stereotype vulnerability in the model, since a relationship between memory self-efficacy and memory performance has been established in prior research (Berry, et al., 1989; Cavanaugh, 1996; Hertzog, et al., 1990). Additional models were developed and analyzed. A fully saturated model, represented in Figure 2, failed to converge, as did a model hypothesizing both a direct and an indirect relationship between explicit memory performance represented by Figure 3.

A model examining the relationship between stereotype vulnerability, memory self-efficacy and implicit memory performance (see Figure 4) resulted in a nonsignificant chi square, $\chi^2(5, N = 46) = 9.529$, $p = .09$, indicating some support for this model as a whole. However, the goodness-of-fit index was .915, the standardized root-mean-square residual was .067, and the normed fit index was .423, suggesting that the fit of the model was not supported. The path analysis again yielded only one significant path.
A final model was examined measuring the direct relationship between stereotype vulnerability, without the moderating variable of memory self-efficacy (see Figure 5). This model resulted in a nonsignificant chi square, $\chi^2(3, N = 46) = 6.291, p = .098$, indicating some support for this model as a whole. However, the goodness-of-fit index was .93, the standardized root-mean-square residual was .061, and the normed fit index was .526 suggesting that the fit of the model was not supported.
Figure 2. Representation of alternate hypothesis number 1 which was a fully saturated model.
Figure 3. Representation of alternate hypothesis number 2 which specified a direct relationship with explicit memory performance.
Figure 4. Representation of alternate hypothesis number 3 which specified a direct relationship with implicit memory performance.
Figure 5. Representation of alternate hypothesis number 4 which specifies a direct relationship between age stereotype and memory performance.
CHAPTER 5

Discussion

The present research represented an attempt to extend the research in the area of cognitive self-efficacy and memory performance in an aging population through an examination of the relationships among vulnerability to age-related stereotypes, memory self-efficacy, and performance on memory tasks. The research reviewed in this paper suggested that implicit activation of stereotypes, including those related to aging, are used not only in making judgments concerning others but also in making judgments about one's self (Banaji & Greenwald, 1995; Greenwald & Banaji, 1995). Additionally, the research suggested a relationship between metamemory, including the component of memory self-efficacy, and memory task performance in older adults (Hertzog, et al., 1990). Finally, according to the literature reviewed, age-related memory decline was documented in episodic, explicit, and working memory (Schacter & Graf, 1986). The connecting thread of implicit activation emphasizes the connection between social cognition literature on stereotypes to cognitive research on implicit memory. This research is based on the concept of a match between conditions that operate at learning or initial exposure and those at retrieval or judgment (Tulving & Thompson, 1973), and is an attempt to determine the relationship of these variables when considered in a causal model.
The study specifically focused on measures of implicit, explicit, and working memory, along with measures of age-related stereotypes and memory self-efficacy. It was designed to assess the effect of age stereotypes on memory self-efficacy levels, and the subsequent effect of memory self-efficacy on performance of various tasks of memory and cognitive functioning. The current research attempted to address the cognitive domains of verbal and nonverbal memory, and sequential learning, using multiple standardized measures. In addition, the current study examined memory self-efficacy using the MFQ (Gilewski, et al., 1990) as a measure of predictions for remembering and the MSEQ (Berry, et al., 1989) as a measure of the frequency of memory complaints. Palmore's (1988) FAQ and FAMH was used as a measure of vulnerability to age-related stereotypes.

This study was designed to provide a better understanding of the relationship between age-stereotypes, memory self-efficacy, and memory functioning in older adults. It was generally hypothesized that age-related stereotypes influence memory self-efficacy, which in turn influences memory task performance. According to the model theorized for this research, the manifest variable vulnerability to age-related stereotype affects the manifest variable measuring memory self-efficacy, which in turn affects the manifest variable of memory task performance. For this model memory performance was not directly affected by stereotype vulnerability, but rather the effect was considered to be mediated through memory self-efficacy. The data collected in this research project did not support the hypothesized model.

Sample size is an important consideration when using structural equation modeling. The necessary sample size for reliable results depends on the complexity of the
model, the magnitude of the coefficients, the number of measured variables associated with the factors, and the multivariate normality of the variable distributions (Thompson, 2000). More cases are required for complex models, models with weak relationships, models with few measured variables per factor, and those with nonnormal distributions. Few of these condition combinations have been studied (Loehlin, 1992; Schumacker & Lomax, 1996), and these studies suggest that the input matrix should be based on at least 100-150 cases. Additionally, assuming a minimum of 150 cases, one rough rule of thumb is to have between 5 and 10 cases per parameter estimated (Bentler & Chou, 1987). A higher ratio of cases to parameters is recommended if the distribution of the variables is not multivariate normal. Given this recommendation, the sample size for this research project may not have been sufficiently large to detect the hypothesized relationships.

Additionally, several measures of different aspects of the variables memory self-efficacy, age-related stereotype vulnerability, and memory and learning were taken. The scores from the MSEQ and MFQ, both measures of memory self-efficacy, were strongly correlated. The scores from the FAQ and FAMHQ were also strongly correlated, as were the measures of implicit and explicit memory and learning. Combining or eliminating duplicate measures of variables could reduce the number of cases necessary for analysis.

An additional consideration should address variations on the hypothesized model and relationships of the variables. It is possible that vulnerability to age-related stereotypes has a direct relationship to memory task performance, rather than the indirect effect through the moderator variable of memory self-efficacy. An alternative model could examine the direct relationships between age-related stereotypes and memory task
performance, and memory self-efficacy and memory task performance in an attempt to replicate prior research. Other models incorporating other relevant variables should be examined, including such potential variables as metamemory functioning and memory strategy use, general self-efficacy, or levels of cognitive complexity. Further, as regards the memory variable, the memory and learning tasks performed provide laboratory measures of memory and learning. However, memory tasks more equivalent to those daily tasks examined in the memory self-efficacy questionnaires could be substituted for the experimental tasks used in this study. These types of memory tasks could address memorization of grocery lists, phone numbers and errands, reading comprehension of newspaper articles, visual memory of groups of objects, words, and numbers, or memory for directions to a new location, tasks that are more common to daily living activities, and as a result provide a more relevant measure of everyday memory functioning. And finally, systematic collection of qualitative data resulting from the comments made during the debriefing process could offer insight into potential themes about individual beliefs concerning memory task performance or relevance of memory self-efficacy or age-related stereotype measures.

In light of the current shift in demographics toward an aging population (Row & Kahn, 1987) one of the new challenges in research on the aging process is understanding the physiological, cognitive, and social changes that occur with the aging process, and of particular interest are those changes related to cognitive functioning. As regards to future directions with this research, it remains possible that the hypothesized relationships exist and efforts to examine this possibility should continue. Usually, an older adult cannot
move through a shopping-center as quickly and as agilely as a 25 year old. Along the same line of thought, the 25 year old is not able to put his toes in his mouth in the same way that an infant can. While both situations involve the loss of ability, the period of time from infancy to age 25 is generally considered a progression toward our prime, while the progression from age 25 to age 60 is considered moving past our prime along a path of deterioration. Research in the area of cognitive aging and the effects of vulnerability to age-related stereotypes and memory self-efficacy remains critical in the development of interventions specific and crucial to a successful aging process. An pervasive approach to mitigating the effects of age-related stereotypes on self-efficacy and strategies for the activities of daily living requires an educational process aimed toward promoting the concept of successful aging rather than emphasizing age-related decline.

Realistically youth does fade and changes do occur in physiological and cognitive functions and processes (Light, 1991; Howard, 1996; Ivy, MacLeod, Petit, & Markus, 1992; Smith & Earles, 1996). As a result, many individuals envision the prospect of aging as an inexorable decline toward both mindlessness and mortality. Successful aging does not necessarily advocate the transcendence of the biophysiological limits that are an inherent part of the human process (Ivy, et al., 1992). All individuals age and die and, in the process, demonstrate many of the changes associated with aging. Successful aging is not an equivalent to staying young, since living requires growing old. It is helping people remain vital by emphasizing potentials and possibilities rather than underscoring the average or typical; it is educating individuals to make accommodations and adaptations to the changes that occur throughout the life span. Hopefully, as older adults are encouraged
to challenge their own expectations for themselves as they age, and as younger individuals
are educated through exposure to older adults through individual contact and experiential
activities, the view of the aging process as one of decline and deterioration toward
eventual death will be replaced by a perspective of a process of development and
adaptation to another stage of development in a life span.
REFERENCES


APPENDICES
Appendix A

Participant Number __________

Cognition Laboratory
Biographical Questionnaire

Please complete the following questions:

Name:

__________________________________________________________

Address:

__________________________________________________________

Telephone:

__________________________________________________________

Age: _______ Marital Status:
Date of Birth: _______ ___ Single
Gender: _______ ___ Married
___ Divorced
___ Widowed

Name, address (including telephone number) of a close relative or friend:

__________________________________________________________

__________________________________________________________

Telephone
Number______________________________

Career/Occupation (indicate if retired and give former occupation):

__________________________________________________________

Socio-Economic Status:
___ Lower
___ Upper-lower
___ Lower-middle
___ Middle
___ Upper-middle
___ Lower-upper
___ Upper

Race/Ethnicity:
___ African-American, not of Hispanic origin
___ American Indian or Alaskan Native
___ Asian or Pacific Islander
___ Hispanic
___ White, not of Hispanic origin
Educational History (indicate the number of years completed):

- ___ Elementary or Junior High
- ___ High School
- ___ AA or other Community College
- ___ Business School
- ___ Trade School
- ___ College (B.A., B.S., or equivalent)
- ___ Graduate School (M.A., M.S., or equivalent)
- ___ Graduate School (Ph.D., J.D., or equivalent)
- ___ Medical School (M.D., D.D.S., L.L.D. or equivalent)
- ___ Other (specify) ________________________________

Yearly Income (self or family):

- ___ Under $10,000
- ___ $10,000 to $19,999
- ___ $20,000 to $29,999
- ___ $30,000 to $39,999
- ___ $40,000 to $49,999
- ___ $50,000 or over

Medical Treatment and Other Concerns (occurring within the past 5 years):

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>___</td>
<td>___</td>
</tr>
</tbody>
</table>
| ___ | ___ | High blood pressure
| ___ | ___ | Stroke
| ___ | ___ | Heart disease
| ___ | ___ | Kidney disease
| ___ | ___ | Neurological disease
| ___ | ___ | Head injury
| ___ | ___ | Other (specify) ________________________________
| ___ | ___ | Have you received treatment for psychological problems in the past 2 years (e.g., depression, anxiety)?
| ___ | ___ | Have you had any difficulty sleeping in the past 2 weeks?
| ___ | ___ | Have you experienced any change in your sleeping patterns within the past 3 months?
| ___ | ___ | Have you experienced any change in your eating patterns within the past 3 months?
| ___ | ___ | Have you experienced any major change in your weight within the past 3 months?
| ___ | ___ | Have you had any difficulty with unexplained tiredness within the past 3 months?
| ___ | ___ | Have you had any difficulty with unexplained crying or irritability within with past 3 months?
Do you use tobacco products?
If yes, what product do you use?
If yes, how much per day?

- 1 to 10
- 11-20
- 21-40
- more than 40

Medications: Please list all drugs that you are currently taking, including prescription drugs, vitamins, aspirin, antacids, etc. Also include recreational drugs and alcoholic beverages. This information will remain confidential (continue on back of page as needed).

<table>
<thead>
<tr>
<th>Name of Medication</th>
<th>Amount of Use (regular or occasional)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix B

QUESTIONNAIRE

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 how you remember. 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?

<table>
<thead>
<tr>
<th>major problems</th>
<th>some minor problems</th>
<th>no problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How often do these present a problem for you?

<table>
<thead>
<tr>
<th>a. names</th>
<th>always</th>
<th>sometimes</th>
<th>never</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. faces</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>c. appointments</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>d. where you put things (e.g., keys)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>e. performing household chores</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>f. directions to places</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>g. phone numbers you've just checked</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>h. phone numbers you use frequently</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>i. things people tell you</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>j. keeping up correspondence</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>k. personal dates (e.g., birthdays)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>l. words</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>m. going to the store and forgetting what you wanted to buy</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>n. taking a test</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>o. beginning to do something and forgetting what you were doing</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>p. losing the thread of thought in conversation</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>q. losing the thread of thought in public speaking</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>r. knowing whether you've already told someone something</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
As you are reading a novel, how often do you have trouble remembering what you have read ... ?

<table>
<thead>
<tr>
<th></th>
<th>always</th>
<th>sometimes</th>
<th>never</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. in the opening chapters, once you have finished the book</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>b. three or four chapters before the one you are currently reading</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>c. the chapter before the one you are currently reading</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>d. the paragraph just before the one you are currently reading</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>e. the sentence before the one you are currently reading</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

When you are reading a newspaper or magazine article, how often do you have trouble remembering what you have read ... ?

<table>
<thead>
<tr>
<th></th>
<th>always</th>
<th>sometimes</th>
<th>never</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. in the opening paragraphs, once you have finished the article</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>b. three or four paragraphs before the one you are currently reading</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>c. the paragraph before the one you are currently reading</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>d. three or four sentences before the one you are currently reading</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>e. the sentence before the one you are currently reading</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

How well you remember things that occurred ... ?

<table>
<thead>
<tr>
<th></th>
<th>very bad</th>
<th>fair</th>
<th>very good</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. last month is</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>b. between 6 months and 1 year ago is</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>c. between 1 and 5 years ago is</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>d. between 6 and 10 years ago is</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
## Seriousness of Forgetting

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

<table>
<thead>
<tr>
<th>Situation</th>
<th>Very Serious</th>
<th>Somewhat Serious</th>
<th>Not Serious</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. names</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>b. faces</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>c. appointments</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>d. where you put things (e.g., keys)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>e. performing household chores</td>
<td>1</td>
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<td>3</td>
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<td>3</td>
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<td>g. phone numbers you’ve just checked</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>h. phone numbers you use frequently</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>i. things people tell you</td>
<td>1</td>
<td>2</td>
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</tr>
<tr>
<td>j. keeping up correspondence</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>k. personal dates (e.g., birthdays)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>l. words</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>m. going to the store and forgetting what you wanted to buy</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>n. taking a test</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>o. beginning to do something and forgetting what you were doing</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>p. losing the thread of thought in conversation</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>q. losing the thread of thought in public speaking</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>r. knowing whether you’ve already told someone something</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

## Retrospective Functioning

How is your memory compared to the way it was ... ?

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Much Worse</th>
<th>Same</th>
<th>Much Better</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. 1 year ago?</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>b. 5 years ago?</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>c. 10 years ago?</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>d. 20 years ago?</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>e. when you were 18?</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
### Mnemonics Usage

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

<table>
<thead>
<tr>
<th>Technique</th>
<th>Always</th>
<th>Sometimes</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. keep an appointment book</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>b. write yourself reminder notes</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>c. make lists of things to do</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>d. make grocery lists</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>e. plan your daily schedule in advance</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>f. mental repetition</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>g. associations with other things</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>h. keep things you need to do in a prominent place where you will notice them</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
Appendix C

QUESTIONNAIRE

For each task, please indicate whether you believe you can perform the task by circling either yes or no. If yes is circled, please circle the confidence rating indicating how sure you are of your performance.

**Grocery**
If I heard it twice, I could remember 12 items from a friend's grocery list of 12 items, without taking any list with me to the store.

<table>
<thead>
<tr>
<th>No</th>
<th>Yes</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
<th>50%</th>
<th>60%</th>
<th>70%</th>
<th>80%</th>
<th>90%</th>
<th>100%</th>
</tr>
</thead>
</table>

If I heard it twice, I could remember 10 items from a friend's grocery list of 12 items, without taking any list with me to the store.

<table>
<thead>
<tr>
<th>No</th>
<th>Yes</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
<th>50%</th>
<th>60%</th>
<th>70%</th>
<th>80%</th>
<th>90%</th>
<th>100%</th>
</tr>
</thead>
</table>

If I heard it twice, I could remember 8 items from a friend's grocery list of 12 items, without taking any list with me to the store.

<table>
<thead>
<tr>
<th>No</th>
<th>Yes</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
<th>50%</th>
<th>60%</th>
<th>70%</th>
<th>80%</th>
<th>90%</th>
<th>100%</th>
</tr>
</thead>
</table>

If I heard it twice, I could remember 5 items from a friend's grocery list of 12 items, without taking any list with me to the store.

<table>
<thead>
<tr>
<th>No</th>
<th>Yes</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
<th>50%</th>
<th>60%</th>
<th>70%</th>
<th>80%</th>
<th>90%</th>
<th>100%</th>
</tr>
</thead>
</table>

If I heard it twice, I could remember 2 items from a friend's grocery list of 12 items, without taking any list with me to the store.

<table>
<thead>
<tr>
<th>No</th>
<th>Yes</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
<th>50%</th>
<th>60%</th>
<th>70%</th>
<th>80%</th>
<th>90%</th>
<th>100%</th>
</tr>
</thead>
</table>

**Phone**
If I looked up 3 phone numbers in the phone book at the same time, I could remember 3 complete phone numbers.

<table>
<thead>
<tr>
<th>No</th>
<th>Yes</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
<th>50%</th>
<th>60%</th>
<th>70%</th>
<th>80%</th>
<th>90%</th>
<th>100%</th>
</tr>
</thead>
</table>
If I looked up 3 phone numbers in the phone book at the same time, I could remember 2 complete phone numbers.

No   Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

If I looked up 3 phone numbers in the phone book at the same time, I could remember 1 complete phone number plus the first 3 digits in 1 other phone number.

No   Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

If I looked up 3 phone numbers in the phone book at the same time, I could remember 1 complete phone number.

No   Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

If I looked up 3 phone numbers in the phone book at the same time, I could remember the first 3 digits of one phone number.

No   Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

Picture

If someone showed me the pictures of 16 common everyday objects, I could look at the pictures once and remember the names of 16 of the objects.

No   Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

If someone showed me the pictures of 16 common everyday objects, I could look at the pictures once and remember the names of 13 of the objects.

No   Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

If someone showed me the pictures of 16 common everyday objects, I could look at the pictures once and remember the names of 8 of the objects.

No   Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

If someone showed me the pictures of 16 common everyday objects, I could look at the pictures once and remember the names of 5 of the objects.

No   Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%
If someone showed me the pictures of 16 common everyday objects, I could look at the pictures once and remember the names of 2 of the objects.

No   Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

Location
If I had just placed 10 items in different locations in a room, I could remember where I had put 10 of the items.

No   Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

If I had just placed 10 items in different locations in a room, I could remember where I had put 8 of the items.

No   Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

If I had just placed 10 items in different locations in a room, I could remember where I had put 6 of the items.

No   Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

If I had just placed 10 items in different locations in a room, I could remember where I had put 4 of the items.

No   Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

If I had just placed 10 items in different locations in a room, I could remember where I had put 2 of the items.

No   Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

Word
If someone read the list to me twice, I could remember the names of 12 common objects from a list of 12 names.

No   Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

If someone read the list to me twice, I could remember the names of 10 common objects from a list of 12 names.

No   Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%
If someone read the list to me twice, I could remember the names of 8 common objects from a list of 12 names.

No Yes 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

If someone read the list to me twice, I could remember the names of 5 common objects from a list of 12 names.

No Yes 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

If someone read the list to me twice, I could remember the names of 2 common objects from a list of 12 names.

No Yes 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Digit
If I carefully studied 20 numbers printed in a series on a piece of paper, I could remember 20 numbers in a row.

No Yes 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

If I carefully studied 20 numbers printed in a series on a piece of paper, I could remember 16 numbers in a row.

No Yes 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

If I carefully studied 20 numbers printed in a series on a piece of paper, I could remember 11 numbers in a row.

No Yes 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

If I carefully studied 20 numbers printed in a series on a piece of paper, I could remember 7 numbers in a row.

No Yes 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

If I carefully studied 20 numbers printed in a series on a piece of paper, I could remember 3 numbers in a row.

No Yes 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Map
If a friend gave me the directions to his or her new house, and the directions involved 10 steps, a few minutes later I could draw part of the route to the house on a map, using all 10 steps in the directions.

No  Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

If a friend gave me the directions to his or her new house, and the directions involved 10 steps, a few minutes later I could draw part of the route to the house on a map, using the first 8 steps in the directions.

No  Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

If a friend gave me the directions to his or her new house, and the directions involved 10 steps, a few minutes later I could draw part of the route to the house on a map, using the first 6 steps in the directions.

No  Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

If a friend gave me the directions to his or her new house, and the directions involved 10 steps, a few minutes later I could draw part of the route to the house on a map, using the first 4 steps in the directions.

No  Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

If a friend gave me the directions to his or her new house, and the directions involved 10 steps, a few minutes later I could draw part of the route to the house on a map, using the first 2 steps in the directions.

No  Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

Errands
If a friend asked me to do 10 errands, 5 minutes later I could remember 10 of the errands I had to do.

No  Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

If a friend asked me to do 10 errands, 5 minutes later I could remember 8 of the errands I had to do.

No  Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%
If a friend asked me to do 10 errands, 5 minutes later I could remember 6 of the errands I had to do.

No  Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

If a friend asked me to do 10 errands, 5 minutes later I could remember 4 of the errands I had to do.

No  Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

If a friend asked me to do 10 errands, 5 minutes later I could remember 2 of the errands I had to do.

No  Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

Photographs

If someone showed me the photographs of 10 people and told me their names once, I could identify 10 persons by name if I saw the pictures again a few minutes later.

No  Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

If someone showed me the photographs of 10 people and told me their names once, I could identify 8 persons by name if I saw the pictures again a few minutes later.

No  Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

If someone showed me the photographs of 10 people and told me their names once, I could identify 6 persons by name if I saw the pictures again a few minutes later.

No  Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

If someone showed me the photographs of 10 people and told me their names once, I could identify 4 persons by name if I saw the pictures again a few minutes later.

No  Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

If someone showed me the photographs of 10 people and told me their names once, I could identify 2 persons by name if I saw the pictures again a few minutes later.

No  Yes  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%
Maze
If I had to find the way through a maze (on paper) on my first try, and the directions had 10 steps in them, I could find the way through part of the maze using the all 10 steps in the directions.

No Yes 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

If I had to find the way through a maze (on paper) on my first try, and the directions had 10 steps in them, I could find the way through part of the maze using the first 8 steps in the directions.

No Yes 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

If I had to find the way through a maze (on paper) on my first try, and the directions had 10 steps in them, I could find the way through part of the maze using the first 6 steps in the directions.

No Yes 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

If I had to find the way through a maze (on paper) on my first try, and the directions had 10 steps in them, I could find the way through part of the maze using the first 4 steps in the directions.

No Yes 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

If I had to find the way through a maze (on paper) on my first try, and the directions had 10 steps in them, I could find the way through part of the maze using the first 2 steps in the directions.

No Yes 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Appendix D

Participant Number _____________

QUESTIONNAIRE

Mark the statements "T" for true, or "F" for false.

___ 1. The majority of old people (age 65+) are senile (have defective memory, are disoriented, or demented).
___ 2. The five senses (sight, hearing, taste, touch, and smell) all tend to weaken in old age.
___ 3. The majority of old people have no interest in, nor capacity for, sexual relations.
___ 4. Lung vital capacity tends to decline in old age.
___ 5. The majority of old people feel miserable most of the time.
___ 6. Physical strength tends to decline in old age.
___ 7. At least one-tenth of the aged are living in long-stay institutions (such as nursing homes, mental hospitals, homes for the aged, etc.).
___ 8. Aged drivers have fewer accidents per driver than those under age 65.
___ 9. Older workers usually cannot work as effectively as younger workers.
___ 10. Over three-fourths of the aged are healthy enough to carry out their normal activities.
___ 11. The majority of old people are unable to adapt to change.
___ 12. Old people usually take longer to learn something new.
___ 13. It is almost impossible for the average old person to learn something new.
___ 14. Older people tend to react slower than younger people.
___ 15. In general, old people tend to react slower than younger people.
___ 16. The majority of old people say they are seldom bored.
___ 17. The majority of old people are socially isolated.
___ 18. Older workers have fewer accidents than younger workers.
___ 19. Over 15% of the population are now age 65 or over.
___ 20. The majority of medical practitioners tend to give low priority to the aged.
___ 21. The majority of old people have incomes below the poverty line (as defined by the federal government).
___ 22. The majority of old people are working or would like to have some kind of work to do (including housework and volunteer work).
___ 23. Old people tend to become more religious as they age.
___ 24. The majority of old people say they are seldom irritated or angry.
___ 25. The health and economic status of old people will be about the same or worse in the year 2000 (compared to younger people).
___ 26. The majority of persons over 65 have some mental illness severe enough to impair their abilities.
___ 27. Cognitive impairment (memory loss, disorientation, or confusion) is an inevitable part of the aging process.
28. If an older mental patient makes up false stories, it is best to point out that he or she is lying, in order to reduce this behavior.
29. The prevalence of neurosis and schizophrenia increases in old age.
30. Suicide rates increase with age for women past 45.
31. Suicide rates increase with age for men past 45.
32. Fewer of the aged have mental impairments, when all types are added together, than other age groups.
33. The primary mental health problem of older age is cognitive impairment.
34. Alzheimer's disease (progressive senile dementia) is the most common type of chronic cognitive impairment among the aged.
35. There is no cure for Alzheimer's disease.
36. Most patients with Alzheimer's disease act the same way.
37. Organic brain impairment is easy to distinguish from functional mental illness.
38. It is best not to look directly at older mental patients when you are talking to them.
39. It is best to avoid talking to demented patients because it may increase their confusion.
40. Demented patients should not be allowed to talk about their past, because it may depress them.
41. The prevalence of cognitive impairment increases in old age.
42. Isolation and hearing loss are the most frequent causes of paranoid disorders in old age.
43. Poor nutrition may produce mental illness among the elderly.
44. Mental illness is more prevalent among the elderly with less income and education.
45. The majority of nursing home patients suffer from mental illness.
46. The elderly have less sleep problems than younger persons.
47. Major depression is more prevalent among the elderly than among younger persons.
48. Widowhood is more stressful for older women than for younger women.
49. More of the aged use mental health services than do younger persons.
50. Psychotherapy is usually ineffective with older patients.
Appendix E

INFORMED CONSENT TO PARTICIPATE IN RESEARCH PROJECT/STUDY

Name of Project/Study: Judgment and Decision Making Across the Life Span

1. I, ________________________________, agree to participate in a research project conducted by scientists at Western Kentucky University. I understand that the project involves research and that the purpose of the research is to study how the process of making judgments and decisions varies across the life span.

2. I understand that the procedures to be followed are: I will first complete questionnaires concerning my background (age, education, and income) and general health. I will then be administered several tasks designed to assess my ability to make judgments and perform related mental operations. I understand that the judgment task that I am given will be simple and well within my ability to complete. I will also be administered tasks that measure cognitive abilities such as my vocabulary and the extent of my general knowledge. All of these tasks will be drawn from standard psychological test batteries and from published psychological studies. Finally, I will complete a questionnaires concerning my own perception of my ability to make judgments.

I understand that these tasks and questionnaires will be administered to me in the Cognition Laboratory at Western Kentucky University.

3. I understand that I may decline to answer specific questions in any of the questionnaires administered in this study if I so choose and that by completing these questionnaires I give my consent for use of these data by the researchers.

4. I understand that the tasks and questionnaires that will be administered in this study are experimental in nature. They are not related to my ability to carry out normal daily activities or job-related duties.

5. I understand that my scores on the tasks in this study will not be available to any individual who is not associated with this study. I also understand that my scores will be combined with those of other participants to obtain group scores and that information on group performance will be available to me, if I so desire, in written reports of the results of this research.

6. I understand that any information about me obtained as a result of my participation in this research will be kept as confidential as legally possible. No information identifying me or indicating the fact of my participation in this study will be released without my permission. A statistical report of the results of this research project/study may be disclosed in a scientific paper, however, participants will not be identified by name.
7. I understand that the only foreseeable risks or discomforts to me as a result of participation in this study may be a feeling of boredom during the procedure or a feeling of not doing well. I understand that there is nothing unusual about these feelings and that I may discuss any perceptions and feelings that I have about the research with the interviewer if I so desire.

8. I understand that the benefits to me or to others which may be reasonably expected from the research are: a change to contribute to the understanding of how important psychological processes change with age.

9. I understand that I will receive monetary compensation in the amount of $5.00 for my participation. I further understand that the primary costs I will incur as a result of participating in this research are in time spent with the interviewer — approximately 1 ½ hours for each of two sessions are required to complete all tasks.

10. I understand that my participation in this research study is voluntary, that my refusal to participate will involve no penalty or loss of benefits to which I might be otherwise entitled and that I may discontinue my participation at any time without penalty or loss of benefits to which I am otherwise entitled.

11. I understand that the consequences of my decision to withdraw from the research study and the procedures for orderly termination of my participation are: none.

12. I understand that the anticipated circumstances under which my participation may be terminated by the investigator without regard to my consent are: none.

13. I understand that significant new findings developed during the course of this research, which may related to my willingness to continue participation, will be provided to me.

14. I have had an opportunity to ask questions about the research project. I understand that I am to contact Dr. Sharon Mutter, Tel. (502)745-4389 for answers to pertinent questions about research and that questions concerning the conduct of this study can be referred to Jay Sloan, Chairperson, Committee for the Protection of Human Research Subject, Western Kentucky University, Bowling Green, KY 42101, tel. (502)745-4981.

15. I have received a signed copy of this consent form.

Signature of Participant ____________________________

Witness ____________________________

Date and Time ____________________________