THE UNIVERSITY OF CALGARY

Development of Training Programs for Memory Enhancement for Older Adults in Community Settings

by

May D. Caprio-Prevette

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a dissertation entitled "Development of Training Programs for Memory Enhancement for Older Adults in Community Settings" submitted by May D. Caprio-Prevette in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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ABSTRACT

The purpose of the study was to develop a memory enhancement training program for community-dwelling older adults aimed at encouraging adaptive beliefs and behaviours about memory function and abilities in later life. The study evaluated the effectiveness of cognitive restructuring techniques as compared to implementation of traditional memory training techniques. Cognitive restructuring as a training procedure was used to challenge subjects' cognitive distortions to demonstrate that memory can be improved, and negative self-conceptions contributing to poor memory performance may be changed. An educational component was given to all subjects to provide information on topics that are recognized as having influence on memory performance.

Subjects were 117 community-dwelling older adults between the ages of 65 and 76 years. A pretest assessment battery including measures of memory performance, memory perception, and affective symptomatology was completed individually for each subject. Subjects attended 20 hours of Cognitive Restructuring Memory Training classes (CRG; n = 56) or the Traditional Memory Training classes (TMG; n = 61). Posttest assessments were conducted after 10 weeks of memory training classes. Follow up assessments were conducted for each subject 9 weeks after the completion of the memory classes to assess maintenance of memory performance levels and memory beliefs. The TMG approach was considered as a comparison group since past research has shown that it produces limited beneficial effects in memory performance, therefore, a no-treatment control group was not included.

Three 2 X 3 (Treatment X Time) repeated measures multivariate analyses of variance were conducted to evaluate the effects of two types of intervention on memory performance, memory perception, and affective symptomatology over time. Results of the data suggest that cognitive restructuring techniques may help community-dwelling older adults gain control over their beliefs about memory and enhance their memory performance. The CRG subjects were able to enhance their memory performance, from pretest to posttest, and sustain the improvements 9 weeks after treatment. The CRG subjects demonstrated a significant increase of positive self-conceptions about memory as compared to the TMG subjects at posttest, and sustained these beliefs 9 weeks after treatment.

Implications of the findings for future memory enhancement programs for older adults are discussed in terms of the benefits of including a cognitive restructuring component.

ACKNOWLEDGEMENTS

I would like to express grateful appreciation to my supervisor, Dr. P. S. Fry for her countless hours spent reviewing proposals and drafts, and providing prompt and invaluable feedback. Her expertise as researcher, teacher, and author has enriched my experience as a graduate student and professional.

I would like to thank the other members of my supervisory committee, Dr. Philip Eaton for his supportive consultation and useful recommendations; and Dr. Michael King for providing suggestions and feedback on drafts of the dissertation, and for granting an opportunity to better understand adult cognition in a hospital setting. Further, I am indebted to Dr. Mark Kolodziej for his informative and supportive consultation as researcher and statistician independent from the university.

I would like to express gratitude to Debra Isaac, JoAnn Travis, and Anne Waddell, who work in the Department of Educational Psychology office, for their support and help in expediting the completion of the dissertation, and to Dagmar Walker for her timely advice and computer expertise.

Marjorie Francis and Judy Shannon shared in the challenging task of teaching the memory training classes for the study. The knowledge and experience that they contributed greatly enriched the quality of the classes. Their commitment and support throughout the various stages of the study has been unprecedented.

I am indebted to the many participating agencies who encouraged their members to become invloved in the memory research. I wish to give a very special thanks to Hilda Townsend at Bow Cliff Seniors whose encouragement and support was unsurpassed. I wish to thank Pat Allen at the Kerby Centre and Dianne Langeworth at Confederation Park Seniors for their support and accommodation of classroom space for the memory classes.

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Deep appreciation is expressed to Edna Bodie, Lydia Hudak, and Marlene Dreher for their loving care of my children, and their flexibility and dependability.

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DEDICATION

This dissertation is foremost dedicated to

my husband

Thaddeus Shore Prevette.

I also dedicate this dissertation to

my children

Stephanie Marie Caprio Prevette

Tyler Joseph Prevette

and to my parents

Dr. Joseph M. Caprio and Marilyn F. Caprio.

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CHAPTER 1

INTRODUCTION

Memory loss is one of the most prevalent concerns of older adults in our society. A survey of more than 14,000 adults over the age of 55 years showed an increase, with age, in the percentage of older adults reporting memory difficulties (Cutler & Grams, 1988). In the past, memory changes in older adults' functioning have been interpreted as evidence of age-related and irreversible losses in cognitive abilities (Botwinick, 1967; Craik, 1977; Eisdorfer & Wilkis, 1973; Horn, 1970; Horn & Cattell, 1967; Jones, 1959; Jones & Conrad, 1933; Walsh, 1975). However, investigators in recent years (e.g., Bromley, 1990; Howe & Brainerd, 1988; Perlmutter, Adams, Berry, Kaplan, Person, & Verdonik, 1987; Poon, 1986; Weinert & Perlmutter, 1988) are becoming more aware of the multivariate nature of memory. These investigators suggest that no one hypothesis can adequately explain all the observed age changes in memory or predict whether some of these losses can be remedied or reversed. Researchers are beginning to look beyond biological changes affecting neural mechanisms of memory and are investigating environmental and psychological influences on age changes in memory (Adams, 1991; Cavanaugh, 1987; Fry, 1989; Hertzog, Dixon, & Hultsch, 1990; Howe & Brainerd, 1988; Kelley, 1986; Ryan, 1992). This has led some researchers (Elliott & Lachman, 1989a; Erber, Szuchman, & Rothberg, 1990; Lachman, Weaver, Bandura, Elliott, & Lewkowicz, 1992; Weaver, 1990) to explore memory beliefs and affective variables that may influence memory performance in older adults, and to determine the extent to which some of these losses in memory performance can be

reversed by helping older adults to restructure their attitudes or belief systems concerning the effects of aging on memory performance.

Rationale for the Study

The belief that memory declines with age may contribute to a negative view of one's memory. This may impact on memory performance and mental health of older adults by contributing to depression and anxiety (e.g., Fry, 1986; Perlmutter, Adams, Berry, Kaplan, Person, & Verdonik, 1987; Poon, Fozard, & Treat, 1978). Depression and anxiety may contribute to and stem from memory deficits in older adults by leading them to extreme self-focusing and worry about memory decline (Labouvie-Vief, 1976; Yesavage, 1984; Yesavage, Rose, & Spiegel, 1982; Zarit, Cole, & Guider, 1981).

One theory of the etiology of depression suggests that dysfunctional thoughts and negative perceptions are a significant contributor to depression (Beck, 1967, 1976; Beck, Rush, Shaw, & Emery, 1979; Burns, 1980, 1989; Ellis, 1962). Maladaptive emotional and behavioural reactions are precipitated and maintained by "unrealistic" (Beck, 1967) or "irrational" (Ellis, 1962) cognitions that result from illogical, rigid, or imprecise processing of information. Unrealistic or irrational cognitions about one's memory functioning in older adulthood, therefore, may lead to a lowered evaluation of one's memory abilities. This, in turn, may contribute to decreased effort, less use of effective memory strategies, avoidance of challenging situations, and failure to seek medical attention for disease-related symptoms of forgetting. Therefore, it is postulated that in some older adults, remediation of memory deficits that may reflect depression and anxiety,

will improve memory performance and, subsequently, will also reduce depression and anxiety.

Previous memory strategy training programs for memory enhancement of older adults have used a variety of approaches and techniques such as verbal elaboration (Hulicka & Grossman, 1967), visual imagery (Poon, Walsh-Sweeny, & Fozard, 1980), name-face recall mnemonic training (Hill, Sheikh, & Yesavage, 1988; Yesavage, Rose, & Bower, 1983), imagery pretraining (Yesavage, 1983), and method of loci training (Anschutz, Camp, Markely, & Kramer, 1985; Robertson-Tchabo, Hausman, & Arenberg, 1976; Yesavage & Rose, 1983, 1984a). However, the effectiveness of these traditional memory training techniques has been limited in two respects.

First, the effects of traditional memory training intervention are not long maintained (Anschutz, Camp, Markley, & Kramer, 1985; Erber, Abello, & Moninger, 1988; Robertson-Tchabo, Hausman, & Arenberg, 1976; Treat, Poon, & Fozard, 1981; Wood & Pratt, 1987). Second, the extent to which traditional memory training has generalized to transfer tasks is minimal (DeLeon, 1974; Hellebusch (1976). For example, DeLeon (1974) found no evidence of generalization of training on paired associate tasks to daily living tasks, such as memory of a grocery list, a memory task involving a personal narrative, and remembering names and occupations of photographed persons.

Given the apparent ability of the elderly to benefit from traditional memory training programs (Hulicka & Grossman, 1967; Kliegl, Smith, & Baltes, 1986, 1989; Treat & Reese, 1976; Yesavage, Rose, & Bower, 1983) what factors might account for failure to produce

generalized, sustained improvements in memory in real-life settings and in daily functioning activities of elderly persons? Several investigators have suggested that memory performance is related to **metamemory**.

Flavell (1971) coined the term 'metamemory' to describe a person's knowledge and awareness of one's memory processes. The term has been expanded to include cognitions about memory such as strategy selection, knowledge about how memory functions, feelings about memory, and memory self-efficacy (Berry, West, & Dennehey, 1989; Hertzog, Hultsch, & Dixon, 1989). It has been argued that memory performance is affected by the individuals' beliefs and motivations to improve performance, both factors having important implications for memory enhancement in older adults (cf. Herrman, 1982; Nisbett & Wilson, 1977; Sutherland, Watts, Baddeley, & Harris, 1986). Researchers have suggested that older adults in memory training studies failed to apply newly learned strategies in everyday settings because of poor motivation resulting from erroneous beliefs that memory inevitably declines in old age (Perlmuter & Monty, 1989, 1986; Poon, 1985).

It has been suggested by several researchers (Dixon & Hertzog, 1988; Elliott & Lachman, 1989a; Lachman, Steinberg, & Trotter, 1987) that age-based memory stereotypes may play a critical role in the development of negative memory beliefs and memory performance. Therefore, poor memory performance in later years may be the final outcome of negative beliefs about memory that individuals developed in their earlier years, known as **premature cognitive commitments** (Chanowitz & Langer, 1981). Subsequent memory loss in middle adulthood or old age

may trigger the unquestioned belief held in earlier years that an individual will experience inevitable and irreversible memory loss in later years. Expectations of memory decline in the later years may, therefore, lead older adults to be more conscious of the same everyday forgetting that they have experienced all their lives and to focus on the underlying negative beliefs that they held in the earlier years. Focus on these negative beliefs are strengthened by way of private speech or internal dialogue with oneself which frequently go unchallenged (Fry, 1992a). The negative belief that memory inevitably deteriorates with age may result in actual memory decline, as beliefs have long term effects. Researchers on cognitive development and performance have, therefore, stressed the significance of identifying premature cognitive commitments on memory beliefs and memory performance in late adulthood (cf. Elliott & Lachman, 1989a; Fry, 1984, 1986).

Several studies and theoretical models of memory have stressed that successful memory function requires not only skills, but also positive and optimistic self-conceptions that foster effective use of these skills (Bandura, 1988; Elliott & Dweck, 1988; Rodin, Cashman, & Desiderato, 1987). Self-conceptions of memory include a set of beliefs concerning one's memory capabilities, the degree to which one can exercise control over one's memory, and whether aging results in irreversible memory loss (Elliott & Lachman, 1989a). These studies are predicated on the assumption that beliefs about one's control and self-conceptions of memory aging are inextricably linked with actual performance (Lachman, 1986; Lachman, Steinberg, & Trotter, 1987).

A number of studies have noted that older adults are more prone to dysfunctional attributions and control beliefs (Dixon & Hultsch, 1983; Erber, Szuchman, & Rothberg, 1990; Lachman, Steinberg, & Trotter, 1987) than younger adults. Lachman, Steinberg, and Trotter (1987) suggest how learning to modify dysfunctional attributions and control beliefs may have positive consequences. Cognitive interventions that enhance subjects' feelings of control lead to more generalized effects than other types of cognitive intervention (Gergen & Gergen, 1986; Perlmuter, Monty, & Chan, 1986).

Advocates of **attribution retraining** maintain that many cognitions, behaviours, and affects are the consequences of causal attributions a person makes about behavioural outcomes or events (Forsterling, 1980, 1984, 1985, 1986). Attribution retraining focuses on teaching individuals more "favourable" causal attributions, such as attributing failure or deficits in performance to insufficient effort instead of lack of ability.

Preliminary evidence resulting from studies of older adults suggests that negative beliefs about memory changes and developments may be altered. The elderly are especially prone to problematic attributions and control beliefs, and modifying negative beliefs may have positive consequences. However, the results also suggest that merely modifying the attributions will not produce generalized, sustained improvements in affect and memory performance. A more comprehensive program of **cognitive restructuring** specifically aimed at modifying control beliefs and self-conceptions of memory is expected to have a more enduring and widespread effect on both attributions and

memory performance. Attributional modification principles and cognitive restructuring are similar in the treatment perspective in that they both assume that maladaptive behavioural and emotional reactions can be modified by changing the intervening cognitions.

Thus, it is tentatively concluded by a number of researchers (e.g., Elliott & Lachman, 1989a; Fry, 1984; Lachman, et al., 1992) that interventions which include cognitive restructuring may be implemented to systematically challenge and change unrealistic or irrational cognitions and replace them with more realistic or rational ones. Additionally, it is suggested that attribution retraining may be used to teach older adults to attribute forgetting to lack of effort, as opposed to lack of ability, in order to increase the likelihood of successful remembering. Applying cognitive restructuring and attribution retraining techniques to interventions aimed at improving memory and self-conceptions of memory may be effective in a two-fold way: (a) to bolster memory performance, and (b) to prevent potential negative self-conceptions from leading to declining mental health and further memory deterioration in the later years.

Objectives of the Study

The overall objective of the present study was to develop an intervention program of memory enhancement aimed at helping older adults to gain control over their thoughts about memory and memory abilities. Specific objectives of the study were:

1) to develop and evaluate the effectiveness of a memory training program aimed at teaching older adults components of cognitive restructuring and attribution retraining, and to compare the

effectiveness of this training program with that of a traditional memory training program,

2) to implement a memory training program for older adults which has as its core component a training procedure which encourages challenging dysfunctional thoughts or cognitive distortions; such a training procedure is predicated on the assumption that memory can be improved and negative self-conceptions contributing to poor memory performance changed,

3) to examine whether cognitive restructuring strategies contribute to maintenance of memory performance improvements 9 weeks after intervention, and

4) to provide all subjects an opportunity to obtain basic educational information about memory abilities and memory functioning.

Scope of the Study

The present research focused on community-dwelling older adults screened for mental and physical conditions affecting memory function. Volunteer subjects showing signs of severe depression, dementia, or physical conditions that may affect cognitive processing such as head injuries, cardiac abnormalities, multiple sclerosis, or hypertension were excluded from the study.

Subjects for the research were drawn from a pool of senior volunteers between the ages of 65 to 76 in the Calgary area who responded to newspaper advertisements, bulletin board posters, and general contact at seniors' organizations. The study was specifically designed to assess memory performance, memory perception, and affective symptomatology (i.e., anxiety and depressive symptomatology) in a four-

wave pretest (Time 1 testing), 10 week intervention, posttest (Time 2 testing), and nine week follow up (Time 3 testing) design. These three target areas (i.e., memory performance, memory perception, and affective symptomatology) exemplify current investigations of memory and aging which have moved beyond simplistic descriptions and explanations of deficits attributed to chronological age, toward an integration of the many components of memory training, such as, memory task, context, and person variables that influence memory performance.

Definition of Terms

The following definitions apply to this research:

Cognitive Restructuring Memory Training

Cognitive restructuring is defined as the process of systematic identification of maladaptive cognitions and attitudes, followed by focusing on the errors in thinking, and generating alternate and more realistic explanations (Beck, 1976; Beck, Rush, Shaw, & Emery, 1979; Beck & Weishaar, 1989). In a training period, subjects are taught to systematically replace disparaging thoughts about memory with more realistic and motivating cognitions predicated on the assumption that it is possible to enhance memory ability.

Attributional Retraining

Attributional retraining "... [involves identifying] behaviours that are considered to be undesirable (e.g., impaired performance following failure), and that are believed to be caused by specific attributional predispositions (e.g., attributing failure to low ability). In a training period, subjects are taught more 'favorable'

[sic] causal attributions (e.g., ascriptions of failure to insufficient effort)" (Forsterling, 1985, p.497).

Traditional Memory Training

Traditional memory training is defined as the application of strategies typically used in previous years to enhance memory performance (cf. Gose & Levi, 1985). To date, these techniques have frequently included the following: name recall and visualization, method of loci, peg word system, link or chain system, lists, routines, drills, practical strategies (e.g., appointment books, calendars), and other mnemonic strategies (i.e., alphabetic cuing, alphabetic searching, first letter cuing, acronyms, rhymes, patterns, and sayings).

Educational Component for All Groups

The educational component of the memory enhancement training program given to all subjects was included to provide more information about memory and an opportunity for discussion of several topics that have been recognized as having direct or indirect influence on memory performance, such as, theories of forgetting, how memory works, Alzheimer's disease and other causes of memory decline, nutrition and memory, recreational drugs and memory, medications and memory, sleep and memory, and physical activity and memory.

Proposed Advancements in the Study

Previous memory intervention programs for older adults have typically used a variety of approaches and techniques, such as verbal elaboration (Hulicka & Grossman, 1967), visual imagery (Poon, Walsh-Sweeny, & Fozard, 1980), name-face recall mnemonic training (Hill, Sheikh, & Yesavage, 1988; Yesavage, Rose, & Bower, 1983), imagery

pretraining (Yesavage, 1983), and method of loci training (Anschutz, Camp, Markely, & Kramer, 1985; Robertson-Tchabo, Hausman, & Arenberg, 1976; Yesavage & Rose, 1983, 1984a) to remediate deficits in memory performance. The proposed advancements of the present study to memory intervention programs for older adults include the following approaches.

(1) The current study utilizes cognitive restructuring to explore memory enhancement beyond limitations of the traditional memory training programs for the elderly. Cognitive restructuring is used to modify self-conceptions of memory and challenge cognitive distortions about memory beliefs.

(2) Since limited work on memory enhancement has been done with community-based elders, the present study is designed to develop and assess a memory training intervention program more amenable to implementation in a community setting. Memory research has generally used depressed and cognitively impaired older adults living in institutionalized settings. Since more than 90% of the elderly live in community settings (Statistics Canada, 1990) as opposed to institutional settings, the intention of targeting community-based individuals is to make the study relevant to the majority of older adults.

(3) An advancement in the evaluation procedure used in this study is a follow up assessment of subjects 9 weeks after the memory training classes to examine the sustained effects of the intervention program. This was of particular interest since previous memory research utilizing mnemonic training shows a lack of sustained memory improvement.

In summary, this study was designed to develop and assess a memory training program using techniques of cognitive restructuring and

attribution retraining to be compared with traditional memory training (see Table 1). Specifically, cognitive restructuring and attribution retraining were used to help community-dwelling older adults gain control over their memory functions and performance. It was postulated that greater control over memory functions and performance would decrease the possibility that depression or anxiety about perceived memory decline would interfere with optimal memory functioning.

Table 1

Cognitive-Behavioural Targets for Change for
Cognitive Restructuring Memory Training and Traditional Memory Training

COGNITIVE RESTRUCTURING MEMORY TRAINING

Target	Affective Influences	Performance
Irrational Beliefs, Dysfunctional Thoughts, Premature Cognitive Commitments	Increase in Depression and Anxiety	Lowered Performance in Memory Tasks

Treatment	Affective Influences	Performance
1) Change Irrational Beliefs and Dysfunctional Thoughts through Cognitive Restructuring and Attribution Retraining	Decrease in Depression and Anxiety	Improvement of Performance in Memory Tasks
2) Educational Component		

TRADITIONAL MEMORY TRAINING

Target	Affective Influences	Performance
Ineffective Memory Strategies, Disorganized To-Be-Remembered Information	Increase in Depression and Anxiety	Lowered Performance in Memory Tasks

Treatment	Affective Influences	Performance
1) Application of Mnemonic, Organizational, and Imagery Strategies and Techniques	Depression and Anxiety	Temporary Improvements in Specifically Learned Memory Tasks
2) Educational Component		

CHAPTER 2

LITERATURE REVIEW AND PREVIOUS RESEARCH

Memory and aging is one of the most active fields of study in psychological aging research. Major reviews have documented an increasing amount of research as well as changes in paradigmatic emphasis. However, investigators attempting to review progress attained in memory research acknowledge a need for an acceptable theory that provides a framework and direction for research in the domain of changes in memory performance as related to age (Estes, 1982; Neisser, 1982; Perlmutter, 1988; Tulving, 1979).

Perlmutter (1988) maintains that the study of memory has propagated itself, particularly in the experimental literature. Preoccupation with the method of investigation rather than the problem of understanding memory itself, has generated research questions. Paradigms and techniques have taken precedence over the phenomena of memory.

The study of memory in older adults span several areas, including experimental psychology, neuropsychology, developmental psychology, clinical psychology, and cognitive psychology. Aging and memory researchers have borrowed questions, theories, and methods from these disciplines because so much research has been done in human memory.

Recent reviews (Howe & Brainerd, 1988; Hultsch & Dixon, 1990) reflect the multidimensional nature of memory. A simple theoretical model of the course of human life seems inadequate in accounting for complex human behaviour. There are aspects of the older adult that appear to decline at the same time that other systems increase in

information, complexity, and organization (Weinert & Perlmutter, 1988). No one hypothesis can adequately account for all the observed age differences and ages changes in memory.

Memory and Aging

Poon (1985) noted in his review of the literature on age-related changes in older adults that over 50 percent of all articles published in the psychological sections of gerontology journals in the past 20 years concerned age changes in memory abilities. Much of the research in memory and aging has been directed toward finding which of the psychophysiological functions in remembering are most adversely affected by aging.

The information processing approach (Atkinson & Shiffrin, 1968; Murdock, 1967; Waugh & Norman, 1965) to memory has been the major perspective in memory research for more than 20 years and is predominant in the memory and aging literature. Within this approach memory has been conceptualized as a system of stores (i.e., sensory, primary or short-term, and secondary or long-term) with mechanisms for the registration or encoding, retention or storage, transfer, and retrieval of information.

Sensory memory is postulated to last a few hundred milliseconds. Short-term or primary memory lasts no more than 30 seconds without rehearsal. It is a limited capacity store in which information is still "in the mind". Long-term or secondary memory occurs when the amount of information to be remembered exceeds the span of primary memory. Long-term memory is considered to be permanent.

Sensory Memory and Aging

Sensory memory is a very brief memory store which is affected by sensory and perceptual changes of aging. Sensory memory is labelled iconic memory in the visual system and echoic memory in the auditory system (Crowder, 1976). Information about sensory memory and aging is derived primarily from research on iconic memory. Researchers investigating sensory memory have demonstrated that the least time required to identify a single letter or number is greater for older than younger adults (Cerella, Poon, & Fozard, 1982; Walsh & Thompson, 1978).

Primary Memory and Aging

Research on primary memory has focused on the relative capacity and speed of retrieval from primary memory. Forward memory span is commonly used to evaluate primary memory. Minimal age difference has been found when the number of items to be remembered is approximately seven or less (Botwinick & Storandt, 1974). However, Craik (1977) demonstrated that primary memory capacity does seem to be reduced in older adults if manipulation of information or division of attention during information input is required. Primary memory may be maintained temporarily through rehearsal, lost through displacement, or transferred to secondary memory, where it is assumed to be stored on a more permanent basis.

Secondary Memory and Aging

Older adults perform less well than younger adults in memory tasks involving lists of unrelated words, text passages, and paired associate lists (Gilbert & Levee, 1971). Secondary memory is often differentiated between acquisition, storage, and retrieval. However, the original

assumption that these aspects of secondary memory can be studied independently has been challenged. For example, there is evidence that older and younger adults do not encode information the same way (Craik & Simon, 1980). Fewer older than younger adults spontaneously use mnemonic techniques once they have learned them.

Overall, the majority of experimental memory work on older adults has examined memory decline in the verbal modality. Some studies documenting decline in the nonverbal modality in older adults involve geometric designs, faces, and simple drawings (Arenberg, 1978; Ferris, Crook, Clark, McCathy, & Rae, 1980; Gilbert & Levee, 1971; Park, Puglisi, & Sovacool, 1983).

Cognitive Processing Explanations for Memory Changes

Cognitive processing explanations of memory changes attempt to identify age-related deficits in terms of one of the stages of memory processing. The encoding deficit hypothesis proposes that differential processing of information during the acquisition stage accounts for memory deficits in secondary memory in older adults. These processes include visual elaboration, verbal elaboration, and organization. Evidence supporting this hypothesis comes from studies where age differences in recall are minimized when older adults are provided with instructions to elaborate upon the information or to organize the information at encoding (Hultsch, 1974; Yesavage, 1983; Yesavage & Rose, 1984a).

The retrieval deficit hypothesis suggests that age differences in memory are due to inadequate access during retrieval to stored information. Studies indicating age deficits in recall, but minimal age

deficits in recognition, provide evidence for this hypothesis (Schonfield & Robertson, 1966; Schonfield & Stone, 1979).

However, the original assumption that memory changes may be analyzed in terms of deficits in discrete stages of information processing has been challenged. One avenue of memory research to identify processes underlying memory changes in older adults is related to speed of processing. The time taken to perform tasks exerts considerable effect on performance. For example, older adults given longer to register brief stimuli will perform more like younger subjects. Similarly, older adults given longer to recall or recognize information will perform at levels closer to those of younger adults (Bromley, 1990).

Several researchers (Cerella, Poon, and Williams, 1980; Madden, 1992) suggest that central processes are slowed in older adults by the same amount on a variety of cognitive tasks so that the rate of slowing is constant across tasks. A generalized slowing model for age differences is supported by the evidence that in diverse perceptual and cognitive tasks there is typically a positive correlation between reaction time and adult age (Salthouse, 1985; Waugh & Barr, 1980). Salthouse (1992) concludes that adult age differences in cognitive ability may be attributable to age-related reductions in the speed of carrying out cognitive operations.

Another source of support for a generalized slowing model is the task complexity effect. When the complexity of a task increases, the magnitude of the age difference in reaction time also increases. Several researchers (Botwinick, 1984; Madden, 1985; Puglisi, 1986;

Salthouse, 1980) agree that task complexity or task difficulty account for the disparity in age patterns in memory performance. Salthouse (1992; Salthouse & Skovronek, 1992) proposes that one cause of the age-complexity phenomena is that more complex cognitive tasks require greater demands on working memory that declines with increased age.

However, Hertzog, Raskind, and Cannon (1986) suggest that there are multiple central slowing factors rather than a single slowing processing model. Petros, Zehr, & Chabot (1983) found that older adults are disproportionately slower when accessing categorical (i.e., classification) information about words as compared to lexical access.

Another framework for understanding memory changes in older adults is Craik and Lockhart's (1972) level of processing model. Craik and his colleagues (Craik & Lockhart, 1972; Craik & Simon, 1980) suggest that incoming information is subjected to a series of analyses starting with shallow sensory analysis and proceeding to deeper, more complex, abstract, and semantic analyses. Whether a stimulus is processed at a shallow or deep stage depends upon the nature of the stimulus and the time available for processing. Information processed at a deep level is less likely to be forgotten than that processed at a shallow level.

Therefore, where information processing models of memory emphasize the sequence of stages through which information is moved and processed, levels-of-processing models emphasize memory traces formed as a by-product of perceptual processing. The durability of memory is conceptualized as a function of the depth of processing. Forgetting in the levels-of-processing models arises from failure to process information deeply or failure to use the same processing operations at

retrieval that had been used at encoding. Information that is deeply processed, fully attended to, and analyzed will be retained more durably and longer. Remembering is proposed to occur best when it is meaningfully related to past experience, and when the resulting analysis is distinctive from highly practised routine procedures (Craik, 1981). Craik (1977) extends this argument to account for age differences in memory by suggesting that older adults fail to spontaneously engage in deep semantic processing when presented with information to be remembered.

Attention

Attentional deficits are linked to memory deficits (Gerard, Zacks, Hasher, & Radvansky, 1991). Guttentag (1985) proposed an attentional deficit theory of memory. In his review of the literature on strategy use and incidental learning, he states that older adults may not be capable of performing the mental operations required for effective strategy use because the attentional requirement exceeds attentional capacity. Other researchers also emphasize changes in attentional requirements for efficiency of cognitive processes in memory performance for older adults (Craik, 1977; Craik & McDowd, 1987; Crossley & Hiscock, 1992; Hasher & Zacks, 1979; Rabinowitz & Craik, 1986).

Shiffrin and Schneider (1977) propose a capacity-limitations model of attention. Shiffrin and Schneider (1977) suggest that information processing operations often vary in their attentional demands. Some require very little capacity for attention (automatic), whereas others, such as active rehearsal, require much more attention (effortful). This two-process view of attention suggests that if there is an age-related

decrease in the capacity for attention, then tasks requiring more effortful processing are likely to demonstrate greater decline with age than tasks that can be performed automatically.

Plude and Hoyer (1986) suggest that there is a deficit in divided-attention tasks that increases with aging, whereas focused-attention deficits are less affected by the aging process. Age-related declines in the selectivity of processing information may be mediated by deficits in a) selection of task-relevant information in divided-attention situations, or b) the suppression of information that is irrelevant in focused-attention situations. Inhibitory attentional mechanisms that prevent or suppress irrelevant information from gaining access to working memory become inefficient in older adults (Hasher, Stoltzfus, Zacks, & Rypma, 1990).

Kinsbourne (1980) and Albert and Kaplan (1980) suggest a neuropsychological explanation in which age-related changes in neuronal functioning impair older adults' ability to attend. Kinsbourne suggests that diffuse or localized neuronal depletion leads to attentional deficits in the elderly, whereas Albert and Kaplan (1980) postulate attentional deficits to result from neuronal depletion in the frontal system. These biological explanations, however, do not adequately explain conditions under which attentional deficits may be reversed, nor address the degree of neuronal depletion necessary to result in cognitive impairment.

Learning and Memory

Learning is affected by attention and memory functioning. The influence of organization on recall in learning tasks has been explored

by several investigators (Laurence, 1967; Tulving, 1972). Results indicate a significant correlation between amount recalled and the degree of organization detected. Laurence (1967) demonstrated that older subjects could make use of organization to enhance recall, once the basis of organization was obvious.

As mentioned earlier, Craik and Lockhart (1972) suggest that older adults do not process information as deeply or elaborately as younger adults. "Instructions to learn generally evoke certain strategies for processing in the learners, and this is where older learners are seen to be at the greatest disadvantage: They are assumed to be less likely to engage in elaborate semantic processing" (Hartley, Harker, & Walsh, 1980, p. 241).

Although learning and memory connote two distinct phenomena, they have not been empirically disentangled in learning or memory experiments. Measures that assess learning are contaminated by memory, and vice-versa (Perlmutter, 1988).

In summary, there is sizable literature with the prevalent view that aging produces memory decline (Botwinick, 1984; Craik, 1977; Poon, 1985; Smith, 1980). Laboratory findings have shown that older adults perform worse on tests of memory for new information than younger adults (Craik, 1977; Poon, 1985). Memory capacity is said to be especially reduced in older adults if manipulation of information or division of attention during information input is required (Craik, 1977; Plude & Hoyer, 1986). Performance on memory tasks requiring more effortful processing is likely to demonstrate greater decline with age than is performance on tasks that can be performed automatically (Shiffrin &

Schneider, 1977). Further, the ability to select task-relevant information in divided-attention situations decreases with age, and therefore, results in inefficient working memory (Hasher, et al., 1990). Performance in undivided or focused attention situations is usually unaffected by age (Plude & Hoyer, 1986). Older adults are at a greater disadvantage on recall tasks than recognition tasks compared to younger adults (Kausler, 1982). This is due to task complexity and demand for a greater retrieval component.

Memory declines have been explained in terms of discrete stages of information processing such as the encoding deficit hypothesis and the retrieval deficit hypothesis. Memory changes have also been explained in terms of slowing of central (Salthouse, 1980, 1985, 1992) or multiple processes with age (Hertzog, et al., 1986), and age-related attentional decline (Shiffrin & Schneider, 1977). Levels-of-processing models emphasize depth of processing to account for memory deficits in older adults (Craik, 1977). Others (Albert & Kaplan, 1980; Kinsbourne, 1980) suggest a neuropsychological explanation in which age-related changes in neuronal functioning impair older adults' ability to attend. Refer to Craik (1977), Gorfein and Hoffman (1987), Howe and Brainerd (1988), Poon (1985, 1986), and Poon, Rubin, and Wilson (1989) for a detailed review of the literature on memory and aging.

New Directions in Memory and Aging

While the above research has focused on how memory changes with age, researchers are questioning whether age-related decline is as representative, general, or as severe as previously considered (Baltes & Willis, 1982; Elliott & Lachman, 1989; Lachman & Lachman, 1980;

Perlmutter, 1988; Perlmutter, Adams, Berry, Kaplan, Person, & Verdonik, 1987). Causes of memory decline may be due to factors that are correlated with aging (e.g., fatigue, motivation, control beliefs, depression) and not a direct consequence of aging. This view has been supported by cognitive training studies demonstrating substantial increases in fluid intelligence and other cognitive abilities in older adults (Baltes & Willis, 1982; Baltes, Willis, & Dittman-Kohli, 1988). Memory which reflect accumulated world knowledge, or crystallized intelligence, apparently remains stable or increases during adulthood (Horn, Donaldson, & Engstrom, 1981). Similarly, Lachman and Lachman (1980) claim that memory for knowledge actualization (i.e., information acquired through a life time of experience and education) does not deteriorate with age.

Plasticity theory has at its core the premise that much of the loss in cognitive performance is reversible. Under appropriate circumstances performance on memory tasks can be restored to its previous level of functioning (Baltes & Willis, 1982). Several researchers (Fry, 1992b; Kausler, 1982) argue that age-related cognitive decline is due to behaviour attributable to environmental factors. Cognitive training studies with healthy older adults provide support for this theory (Baltes & Willis, 1982). This has encouraged investigations toward what may be done to ameliorate age-related changes in memory.

Perlmutter (1988) proposes an analytic framework which necessitates "... the acceptance of environmental context, subject state, developmental level, and individual differences ... which all contribute important, systematic, and discoverable variance to

performance" (p. 369). Operative knowledge (operations, procedures, strategies, and skills of memory), epistemic knowledge (information about the world that accrues throughout life), and metacognitive knowledge (knowledge one has about the workings of the cognitive system) contribute to age-related changes in memory performance (Perlmutter, 1988).

Researchers are moving beyond the laboratory and attempting to understand memory changes as they are manifest in everyday life. This has resulted in investigations of everyday memory (Crook, Youngjohn, & Larrabee, 1990; Hartley, 1989; Larrabee & Crook, 1992; West & Crook, 1990; West, Crook, & Barron, 1992; Youngjohn, Larrabee, & Crook, 1991). Rubin (1989) suggests that to understand memory processes of individuals in their natural environment, researchers need to consider the environmental context and subject status.

Much is known about memory processing that is involved in deliberate retention of information over short time intervals in controlled, nondistracting situations. However, there is much to be learned about the ways in which environmental context and subject status contribute to memory.

Traditional Memory Training Programs

Traditional memory training programs aimed at enhancing memory in older adults have been numerous (e.g., Erber, Abello, & Moninger, 1988; Gose & Levi, 1985; Hill, Sheikh, & Yesavage, 1988; Poon, 1984; Rowe & Schnore, 1971; Treat, Poon, & Fozard, 1981; Yesavage, 1983, 1984; Yesavage & Rose, 1984b; Yesavage, Rose, & Bower, 1983). Several studies have demonstrated that with the use of mediators such as visual or

verbal mnemonics and organizational techniques older adults can learn to enhance their memory in laboratory settings (Poon, Walsh-Swenny, & Fozard, 1980; Treat, et al., 1981; Yesavage, 1983, 1984).

Early studies often used a paired-associate paradigm in which performance of subjects was compared under different instructional conditions. Research evidence showed that use of mnemonics and visual or verbal elaboration improved paired-associate and list-learning performances of older adults (Canestrari, 1968; Hulicka & Grossman, 1967; Rowe & Schnore, 1971). Further, the importance of pacing, practice, and self-provided imagery were evident for older adults (Erber, Abello, & Moninger, 1988; Hulicka & Grossman, 1967; Treat, Poon, & Fozard, 1981; Treat & Reese, 1976). Results demonstrated with paired-associate learning were replicated in name/face learning.

Paired-associate learning was repeated in name/face learning and list learning using imagery-based mnemonics. An example of this technique involves choosing a salient feature of a person's face, and forming a mental image of the feature which incorporates a transformation of the person's name. Yesavage and his colleagues (Hill, Sheikh, & Yesavage, 1988; Yesavage, 1983, 1984; Yesavage & Rose, 1984b; Yesavage, Rose, & Bower, 1983) have demonstrated the effectiveness of this technique with older adults. The researchers also found that older adults' memories improve when they are requested to a) make a judgment about the pleasantness of the image formed, b) apply visual imagery pretraining, or, c) apply relaxation pretraining. Similarly, Dirkx and Craik (1992) maintain that imagery processing in the context of memory for verbal information does show age-related decline, although imagery

mnemonics can be effective as a way to improve memory performance in older adults.

The method of loci has also been investigated to determine its effectiveness of enhancing recall of words in older adults. Subjects associate each word on a list with a familiar location through mental imagery. At retrieval, subjects mentally walk through the familiar locations, which serve as cues for the words. Several studies applying the method of loci with older adults have found that initial recall for lists of words improved, although older subjects often did not use the technique when not specifically instructed to do so (Anschutz, Camp, Markley, & Kramer, 1985, 1987; Robertso-Tchabo, Hausman, & Arenberg, 1976). Yesavage and Rose (1983, 1984a) found in their studies that the effectiveness of the method of loci is enhanced when combined with concentration training or when making judgments about the pleasantness of their images.

Kliegl, Smith, and Baltes (1986, 1989) used the method of loci with older adults in conjunction with a methodology known as "testing-the-limits" which entails training subjects to perform well on a task, and then testing them at progressively higher levels of performance. In this way, older adults approach their maximum performance potential. These studies revealed that older adults can be trained to increase their serial recall of words many times more than their baseline level of performance.

Traditional memory training programs have been successful in improving some aspects of memory. However, many of these studies also demonstrate that a) older adults are spontaneously less apt to use

mediators than younger adults (Botwinick, 1967; Canestrari, 1968; Hulicka & Grossman, 1967; Hultsch, 1969, 1971), b) older adults do not use the learned techniques unless they are requested to do so (Schaffer & Poon, 1982), c) enhanced performance emerge for trained tasks only on tests that are highly similar to the training material (DeLeon, 1974), and d) the effects tend to be short-lived (Poon, 1984, 1985). Further, although a presumed goal of memory training is to provide older adults with skills that can be used outside a laboratory setting, it appears that this goal is seldom attained.

Attempts to improve memory training in older adults have included combining several methods of training and elaboration techniques such as judging the pleasantness of an image to augment visual mnemonics (Yesavage, Rose, & Bower, 1983), pretraining programs (Hill, Sheikh, & Yesavage, 1988), and modifying training according to individual differences in variables such as IQ, anxiety level, or initial level of memory performance (Schaffer & Poon, 1982; Yesavage, 1985). These modifications have resulted in performance improvements in that the effects for the trained tasks are stronger or in that there is transfer to a wider range of laboratory tasks. However, existing memory training programs have still failed to produce generalized, sustained improvements in memory. According to Perlmutter (1988), "... the contribution of mnemonic skill development to memory performance generally has been overemphasized" (p. 373). These limitations have led researchers to explore other factors which influence memory performance.

Modifying Control Beliefs, Attributions, and Performance Goals in Older Adults

Metamemory

Several investigators have suggested that memory performance is related to metamemory, or knowledge about memory (Cavanaugh & Murphy, 1986; Hultsch, Dixon, & Hertzog, 1985). Flavell (1971) coined the term 'metamemory' to describe a person's knowledge and awareness of one's memory processes. The term has expanded to include cognitions about memory such as strategy selection, knowledge about how memory functions, feelings about memory, and memory self-efficacy (Berry, West, & Dennehey, 1989; Hertzog, Hultsch, & Dixon, 1989). Brown and her colleagues (Brown, 1975, 1978; Brown, Bransford, Ferrara, & Campione, 1983) distinguish between declarative knowledge (i.e., factual knowledge) and procedural knowledge (i.e., planning, monitoring, and employment of cognition). Dixon and his colleagues (Dixon, 1989; Dixon & Hertzog, 1988) and Ryan (1992) examine metamemory from a life-span developmental perspective.

Memory questionnaires have been developed to evaluate the role of individuals' knowledge and beliefs about their memory on memory tasks (Crook & Larrabee, 1990; Dixon & Hultsch, 1983b; Herrman & Neisser, 1978; Riege, 1982; Sunderland, Harris, & Baddeley, 1983; Zelinski, Gilewski, & Thompson, 1980). The following questionnaires have found frequent usage in memory aging studies: Metamemory in Adulthood Questionnaire (MIA; Dixon & Hultsch, 1983a), the Short Inventory of Memory Experiences (SIME; Herrman & Neisser, 1978), the Everyday Memory Questionnaire (EMQ; Sunderland, Harris, & Baddeley, 1983), and the

Memory Functioning Questionnaire (MFQ; Zelinski, Gilewski, & Thompson, 1980).

Gilewski and Zelinski (1986) and Herrmann (1982), in their review of metamemory scales, noted that questions of concurrent validity have proven to be a challenge in scale development in that correspondence between self-report of memory performance and actual memory function has often been low. Some investigators have reported reliable relationships between memory self-appraisals and performance in the elderly (Cavanaugh & Murphy, 1986; Dixon & Hultsch, 1983b; Hulicka, 1982; Riege, 1982; Sunderland, Watts, Baddeley, & Harris, 1986; Zarit, Cole, & Guider, 1981; Zelinski, Gilewski, & Thompson, 1980), whereas others have failed to find this relationship (O'Hara, Hinrichs, Kohout, Wallace, & Lemke, 1986; Scogin, 1985; Sunderland, Watts, Baddeley, & Harris, 1986; West, Boatwright, & Schadler, 1984; Zarit, Cole, & Guider, 1981). However, individuals' beliefs about their memory performance tend to be stable, although not always accurate (Nisbett & Wilson, 1977; White, 1980). This may have important implications with respect to the individual's beliefs about remediation of memory decline in old age. If memory beliefs affect the older adult's choice of strategies attended to and used, then negative cognitions or dysfunctional beliefs about memory capabilities may cause anxiety and interfere with task-related attention, resulting in lower motivation and memory performance deficits. Several researchers have suggested that older adults in memory training studies fail to apply newly learned strategies in everyday settings because they are not motivated (Perlmuter & Monty, 1989; Poon, 1985). One source of poor motivation may be the elderly

individual's belief that he or she cannot do anything to improve his or her memory.

Self-Conceptions of Memory Aging and Memory Self-Efficacy

It has become increasingly evident that successful functioning requires not only knowledge about memory mechanisms and processes, but also self-conceptions that foster effective use of these skills (Bandura, 1988; Rodin, Cashman, & Desiderato, 1987). An older adult may have extensive and accurate knowledge about how memory functions but may nevertheless believe that his or her ability to remember is poor. Self-conceptions of memory include a set of beliefs concerning one's memory abilities, the degree to which one can exercise control over one's memory, and whether aging results in irreversible memory loss (Elliott & Lachman, 1989a).

Bandura's (1986) concept of self-efficacy provides a theoretical framework for conceptualizing self-conceptions of memory aging. The self-efficacy perspective is consistent with the metamemorial distinction between memory knowledge and memory beliefs. Memory self-efficacy may be defined as beliefs about one's own capability to use memory effectively in a given context (Hertzog, Hultsch, & Dixon, 1989). This approach encourages questions concerning the accuracy of memory beliefs and stimulates development of intervention techniques designed to identify and improve negative self-efficacy beliefs and, perhaps, enhance memory performance.

Control Beliefs

Evidence suggests that control beliefs are important for understanding memory functioning in later life (Grover & Hertzog, 1991;

Lachman & Leff, 1989; Lachman, Steinberg, & Trotter, 1987). Control beliefs indicate the extent to which a performance or outcome is believed due to an individual's own volition as opposed to forces outside oneself (Lachman, 1986). Rotter (1966) has developed one of many models of control beliefs.

Locus of control.

Research suggests a positive correlation between beliefs in personal control and being more likely to take actions necessary to remedy detrimental conditions (e.g., Rodin, 1986). Low levels of perceived control have generally been found to have negative implications for mental and physical health. Rodin and her colleagues (1987, p. 162) concluded in their review of intervention programs for life enrichment and prevention of cognitive decline in the elderly, "that cognitive interventions which affect subjects' feelings of control may lead to more generalized effects than other types of cognitive intervention."

Several researchers have suggested that developmental age changes in locus of control during adulthood ought to reflect a decline in perceived control due to physical, social (e.g.., retirement, lack of respect), and personal losses (e.g., death of friends and family) associated with aging. However, numerous cross-sectional and longitudinal studies investigating whether locus of control changes as an individual ages have produced mixed results.

To address these contradictions in the locus of control literature researchers have begun investigating multidimensionality and domain-specificity of locus of control. Results of this research suggest that

older adults have stronger external control beliefs within the domains of health and intelligence than do younger adults. It is conceivable that these perceptions of low control over the domain of intelligence may generalize to other aspects of cognitive functioning including memory tasks. Lachman (1986) noted that older adults are less likely to believe that they are responsible for maintaining and improving their cognitive performance. Therefore, increased externality in the domain of intelligence in older adults may not be beneficial for optimal cognitive functions such as memory. Similarly, studies with younger and older adults have demonstrated a positive correlation between internality and higher levels of intellectual functioning (Lachman, 1986).

Lachman (1986) hypothesized that differences in personal control would predict changes in cognitive performance in response to training and practice. Specifically, those with a more internal control orientation would also have higher levels of intellectual functioning in later life. Results indicate that treatment groups did not change their perceived control over cognitive aging more than the control groups even though the treatment groups had benefitted from the cognitive training. In fact, both groups equally increased their sense of internal control over intellectual functioning.

The relationship between control beliefs and cognitive performance including memory tasks is not clear. Results of longitudinal studies suggest that it is performance that influences control beliefs (Lachman, 1983). However, findings from intervention studies suggest that it is control beliefs that affect performance (Rodin, 1983). Therefore,

control beliefs can affect cognitive performance outcome, and also, control beliefs can result from perceived age-related changes in cognitive functioning (Grover & Hertzog, 1991). Older persons may adjust their perceptions of cognitive capacity and control to be consistent with age-related changes in cognitive functioning (Heckhausen & Baltes, 1991). Older adults may be aware of their relative intellectual capacities, and therefore, age-related changes in perceived control are associated with actual changes in cognitive functioning (Grover & Hertzog, 1991).

On the other hand, poor performance in situations perceived as cognitively demanding may be caused by low self-efficacy beliefs, anxiety, and ineffective task strategies. If older persons adopt beliefs about age-related decline, they may fail to maintain or optimize effective functioning in cognitively demanding situations even when they are capable of adequate performance.

With respect to memory enhancement programs, it is important to note that in light of the significance of perceived control and cognitive functioning, training programs must include not only skill strategies, but also adaptive attributions and cognitive restructuring to address detrimental beliefs about control over memory aging. To the extent that one can strengthen in the elderly the belief that memory can be controlled and changed, it should enhance their motivation to apply strategies to memory tasks, promote adaptive attributions, and enhance their performance on memory tasks (Dittmann-Kohli, Lachman, & Baltes, 1991; Elliott & Lachman, 1989a).

Attributions and control beliefs.

Lachman, Steinberg, and Trotter (1987) investigated the effects of control beliefs and attributions on memory performance and self-assessments in older adults. Results indicate that elderly subjects were good predictors of their performance on memory tasks. However, it is the explanation that the subjects gave for their performance that influenced their level of performance, rather than their expected performance outcome.

Further, the detrimental effects of maladaptive attributions were more influential than the helpful effects of adaptive attributions. Older adults who made external, unstable, and specific attributions for successful performance, such as luck, demonstrated significant declines in their performance. Therefore, those who did not take credit for their performance success were more vulnerable to performance decrements. Those who attributed their successful performance to internal, stable, and global causes, such as having a good memory, were least likely to demonstrate decrements in performance.

It is significant that several investigators (Blank, 1982; Lachman & McArthur, 1986; Rodin & Langer, 1980) have demonstrated that the elderly are less likely to make internal and stable attributions for successful performance. This emphasizes the importance of the effects of attributions on memory change in later life, and suggests possible benefits of modifying attributional beliefs. Attributing successful performance to internal, stable, and global factors might lead to increased effort, motivation, and expectations of continued success (Abramson, Seligman, & Teasdales, 1978; Bandura, 1977). Older adults

are likely to benefit from a 'positive attributional pattern' (Heckhausen, 1987) when confronted with a memory task. An individual with this pattern applies internal causes when accounting for success and minimal internal causes when explaining failure.

Erber and her colleagues (Erber & Rothberg, 1991; Erber, Szuchman, and Rothberg, 1990) investigated how younger and older adults judge other people's memory failures. Older adults were perceived as having greater mental difficulty than younger persons for the same memory failures. A memory failure considered inconsequential in a young adult was viewed by both the younger and older adults as a sign of mental difficulty in an older person. These expectations may influence the self-image and behaviour of the person being judged. In other words, age-based memory stereotypes may sensitize older adults to be more self-conscious of the same everyday memory failures that they have experienced all their lives. In the causal attribution literature, poor cognitive performance has been attributed to lack of ability more for older adults than for younger adults (Lachman & McAuthur, 1986).

Premature Cognitive Commitment

Evidence suggests individuals make 'premature cognitive commitments' (Chanowitz & Langer, 1981) or perceive expected developmental change across adulthood (Heckhausen & Baltes, 1991; Ryan, 1992) which may influence later behaviour. For example, a young adult may not question the belief that memory loss accompanies old age. This belief may have little effect on him or her until a subsequent memory loss in middle adulthood or old age triggers the unquestioned belief that he or she has a symptom of inevitable and irreversible memory loss.

This belief may result in actual memory deterioration by adversely affecting the degree of effort, use of effective strategies, and avoidance of challenging situations (Ryan, 1992). It may not occur to an older adult that there are alternate beliefs regarding memory functioning in old age to the ones they have assumed for many years.

Therefore, premature cognitive commitments with regard to current memory beliefs and memory performance were explored in this study. Questions were adapted from interviews with 50 older adults with memory complaints (Fry, 1988) and yielded a list of common cognitive distortions (Beck, 1976) used to develop memory exercises for the current investigation.

Attribution retraining.

Attribution theory maintains that many cognitions, behaviours, and affects are the consequences of causal attributions a person makes about behavioral outcomes or events (Forsterling, 1980, 1984, 1985, 1986). Attribution retraining focuses on teaching individuals more "favourable" causal attributions, such as attributing failure to insufficient effort instead of lack of ability. Attribution retraining is guided by the work of Bandura's self-efficacy theory (Bandura, 1977, 1982), Seligman's model of learned helplessness (Maier & Seligman, 1976; Seligman, 1975), and Weiner's attributional model of achievement and motivation (Weiner, 1982, 1985).

Attribution retraining has traditionally addressed reactions in the area of achievement as a result of failure or success (Schunk, 1982, 1983, 1984). However, attributional retraining has also been used in clinical concerns, such as anger, (Forsterling, 1984), loneliness,

alcoholism, and coping behaviour (Antaki & Brewin, 1982). Techniques that have been used in attribution retraining include persuasion (Chapin & Dyck, 1976; Dweck, 1975; Schunk, 1982), modelling (Zoeller, Mahoney, Weiner, 1983), and attributional-relevant information (Wilson & Linville, 1982, 1985). There is empirical support for the effectiveness of attribution retraining, although most investigations have utilized children and young adults.

Lachman and Dick (1987) investigated whether the method of loci training would affect beliefs about memory and whether a brief attribution persuasion retraining technique would enhance the effects of memory training in older adults. Results indicated that word recall improved somewhat for the attribution retraining plus method of loci memory training group, but decreased slightly for the method of loci and control groups. The differences between the effects of memory training on word recall were not conclusive perhaps due to a ceiling effect and limited variability in recall scores.

Attribution retraining in conjunction with memory training was effective in improving memory performance and confidence about memory. The attribution retraining group also developed more adaptive attributions for the transfer task, although not for the trained task, perhaps as a result of ceiling effects in the tasks. However, there was no transfer of training effects to a dissimilar transfer task, for example, text recognition. These results suggest that the combined use of attribution retraining with method of loci training may enhance positive beliefs about memory and memory performance.

In contrast, Weaver (1990) found little support for the hypothesis that combined method of loci and attribution retraining result in enhancements in memory performance. In Weaver's study (1990) older and younger subjects were randomly assigned to one of three conditions: method of loci training, method of loci training plus attribution retraining, or practice alone. There was evidence that memory performance and self-efficacy improved across all conditions.

It should be noted that the attribution retraining component of Weaver's (1990) study had two essential differences in procedures from previous attribution retraining studies. First, attributional information was given after the method of loci was taught. It is conceivable that the benefit of sequencing attribution retraining before learning a memory strategy makes better theoretical sense. Subjects encouraged to believe, a priori, that learning a new skill will be useful for enhancing memory, may be more motivated to learn the skill than those who do not believe that they can do anything to improve their memory performance. Second, attribution information was given to the subjects individually instead of in a group setting, with the result that subjects did not have the benefit of a group training procedure that gave them an opportunity to see that others have similar memory difficulties.

How do self-conceptions mediate attributions, and in turn, affect cognitive performance? Numerous studies indicate that attribution retraining results in increased persistence and improved performance on the trained intellectual task (Dweck, 1975; Lachman & Dick, 1987; Schunk, 1982, 1984). However, these changes are not necessarily

maintained or generalized to other tasks (Forsterling, 1985; Rodin, 1983). It becomes increasingly evident that to help older adults deal effectively with memory problems, one must take into consideration adaptive thought, affect, and behaviour, and not only mnemonic techniques and adaptive attributions.

In summary, the above studies provide preliminary evidence that beliefs about memory can be altered. The elderly are especially prone to problematic attributions and control beliefs, and attempts to modify these may have positive consequences. However, the research results also suggest that modifying attributions alone does not produce the sustained, generalized effect desired. A more comprehensive program of cognitive restructuring specifically aimed at modifying self-conceptions of memory and core motivational components is expected to have a more enduring and widespread effect on memory performance.

Attribution Retraining and Cognitive Restructuring

Several investigators have proposed that attribution retraining should become an integral aspect of cognitive behaviour therapy (Forsterling, 1980, 1984, 1985, 1986; Hayes & Hesketh, 1989). Attributional principles and cognitive behaviour therapy are similar in their central assumptions.

First, both approaches are based on cognitive models of human affect in that they both assume maladaptive behavioural and emotional reactions are modified by changing intervening cognitions. Both follow the stimulus-cognition-response model: that maladaptive emotions and behaviours are not directly caused by internal or external stimuli but

rather by cognitive processing, evaluation, and organization determined by emotional and behavioral reactions.

Secondly, cognitive therapy and attribution retraining emphasize the role of "lay scientists" in regard to the methods used for a person to gain causal understanding (Forsterling, 1985). Scientific thought, empirically and logically examined, leads to functional reactions, whereas unrealistic, irrational cognitions are more likely to give rise to dysfunctional emotions and behaviours.

Thirdly, both schools of thought attach special importance to realistic cognitions. Attribution theory posits that individuals are motivated to attain a realistic causal understanding of the environment and their own actions to predict and control events (Kelley, 1973). Similarly, many cognitive therapies hold that dysfunctional emotions and behaviours are caused by unrealistic and unscientific thinking. Therapeutic strategies frequently consist of collecting and processing information in regard to the unrealistic cognitions. The goal is to help the individual experience more realistic thoughts which will lead to increased functional behaviour. Although attribution retraining is not used to teach individuals realistic attributions, assumptions are made about which attributions are desirable and which are not. Generally, attribution retraining involves teaching individuals to make effort attributions for their failures as opposed to attributions of lack of ability.

Fourthly, both approaches define specific neurotic states in a similar manner. For example, individuals suffering from a reactive depression within a cognitive behavioral paradigm are considered to have

an unrealistically negative view of themselves, their future, and the situation. In attribution theory, a negative view reveals itself in the internal (i.e., negative perception of oneself), stable (i.e., the future), and global (i.e., the whole situation) attributions that depressed individuals adhere to events (Forsterling, 1986).

Two attributional principles may be utilized in conjunction with cognitive restructuring: 1) "attribution of failure to lack of effort maximizes subsequent persistence," and 2) "subjects who exhibit reduced persistence following failure (have) a tendency to attribute their outcomes less frequently to effort than those who persisted following failure" (Forsterling, 1984, p. 510). Therefore, retraining methods ought to aim at teaching those who are not persistent to make attributions like those who are persistent following failure in order to increase the former's likelihood of success.

Acquisition of Learning-oriented Versus Performance-oriented Goals

Approaches to memory tasks are affected by perceptions of ability which orient an individual toward different goals. Elliott and Lachman (1989a) distinguish between learning-oriented goals and performance-oriented goals. Individuals with a learning-orientation view memory as multifaceted, and as possible to improve through effort. Conversely, those with a performance-orientation view memory ability as an entity that automatically deteriorates with age, and that one may do little to stop the deterioration. Empirical evidence for these constructs has developed from investigations in achievement motivation and performance with children (Bandura, 1988; Elliott & Dweck, 1988; Diener & Dweck, 1978, 1980). Elliott and Lachman (1989) developed the Memory Goal Scale

used in the present study to assess learning-oriented and performance-oriented goals with respect to memory.

Bandura and Dweck (1987) demonstrated that children's perceptions of their own abilities orient them toward different goals. In their study, children with performance-oriented goals believed ability to be a fixed trait and tended to seek favourable judgment of that trait. They judged themselves capable only when they effortlessly outperformed others on normatively difficult tasks. However, children with learning-oriented goals believed ability to be a changeable quality and they sought to develop competence. They judged themselves most capable only when they improved their skill through effort on personally challenging tasks.

These different goal orientations suggest very different approaches to intellectual tasks. In a performance-oriented goal perspective high effort would suggest less ability. In a learning-oriented goal perspective high effort would suggest getting smarter. These approaches to assessing ability in achievement situations focus on the task chosen, effort expenditures, interpretations of failure, and affective reactions.

Two approaches to intellectual tasks have been clearly differentiated (Diener & Dweck, 1978, 1980). The master-oriented pattern is characterized by confronting intellectual tasks, effective persistence, and continued positive affect. In contrast, the helpless-oriented pattern is characterized by withdrawal, lack of persistence, and negative affect such as anxiety (Ames, 1984; Diener & Dweck, 1978, 1980).

Wood and Bandura (1987) demonstrated that those who performed a challenging task under an induced fixed trait conception of ability suffered a loss in perceived self-efficacy, lowered their goals, and became less efficient in their strategies. However, those who performed the task under a changeable skill perception of ability sustained their perceived self-efficacy, continued to set challenging goals, and used effective strategies.

Stress reactions and anxiety may be viewed as manifestations of performance-oriented goals combined with low perceived ability. Helping individuals shift to a learning-oriented goal would ameliorate these problems by relieving subjective distress and enhancing performance. This may be more effective than attribution retraining alone, because attributions are a product of achievement goal/perceived ability interactions. Attribution retraining may help individuals decide against the conclusion that they lack ability when they encounter obstacles and thus bolster their confidence that they can do it. However, attribution retraining is not likely to change the performance-oriented goal that predisposes them to evaluate the adequacy of themselves rather than their problem solving strategies (Elliott & Lachman, 1989a).

Numerous studies have demonstrated that older adults make negative ability attributions for failure on memory tasks as they age (Lachman, Steinberg, & Trotter, 1987). This suggests that older adults become increasingly performance-oriented with respect to memory functioning and, therefore, they tend to evaluate their memory capacity rather than maintain and develop it. The combination of performance-orientation and

the belief that memory capacity decreases with age may underlie the negative self-conceptions and deficient performance on memory tasks (Elliott & Lachman, 1989a). Therefore, it would be beneficial to help the elderly become learning-oriented in coping with memory problems. Cognitive restructuring may be an effective way to enhance the acquisition and generalized use of memory strategies.

Cognitive Restructuring

Cognitive restructuring is a therapeutic strategy within the cognitive behavioral model which attempts to alter systematically faulty reasoning underlying maladaptation and to help individuals think more constructively. Cognitive approaches to psychotherapy were introduced by Aaron T. Beck (1967) and Albert Ellis (1962). Both authors propose that maladaptive emotional and behavioural reactions are precipitated and maintained by "unrealistic" (Beck, 1967) or "irrational" (Ellis, 1962) cognitions which result from illogical, rigid, or imprecise processing of information. Hence, therapy involves systematically challenging and changing unrealistic or irrational cognitions and replacing them with more realistic or rational ones. Cognitive restructuring has proven to be an effective treatment of depression (Beck, Rush, Shaw, & Emery, 1979; Fry, 1984). Cognitive restructuring has also been used successfully as a therapeutic modality for concerns other than depression, such as insomnia in older adults (Edinger, Hoelscher, Marsh, Lipper, & Ionescu-Pioggia, 1992), anger control (Hambergers & Lohr, 1980), assertiveness (Jacobs & Cochran, 1982), social phobia (Heimberg, Dodge, Hope, Kennedy, & Zollo, 1990), and sports competition (Gravel, Lemieux, & Ladouceur, 1980).

Lachman, Weaver, Bandura, Elliott and Lewkowicz, (1992) were the first researchers to apply a cognitive restructuring intervention as a way to improve memory performance, and beliefs about memory ability and control. The cognitive restructuring intervention consisted of education and promotion of adaptive versus maladaptive views of memory aging. Subjects were instructed in how to identify these two views of memory and how to shift from maladaptive to adaptive cognitions in two 3-hour sessions. Subjects receiving cognitive restructuring intervention improved their memory performance equally as much as the no-contact control group. However, the older adults receiving cognitive restructuring improved their beliefs about memory controllability. The greatest increase in beliefs about the potential for memory to get better occurred when cognitive restructuring was combined with memory skills training (e.g,. attention, visualization, self-generated memory strategies). Lachman et al. (1992) suggest that additional training sessions may be necessary to improve memory performance beyond practice effects of test-retest.

Rush and Watkins (1981) implemented one of the first studies to compare individual versus group format in which cognitive restructuring is dispensed. Their results, although favouring an individual format, were not conclusive because the group subjects were not part of the same randomly assigned subject pool as were the individual subjects. In a similar, although better designed study, Shaffer and her colleagues (Shaffer, Shapiro, Sank, & Coghlan, 1981) found that cognitive restructuring in a group format is as effective as individual cognitive restructuring in reducing depression and anxiety, and in increasing

assertiveness. Several books have been written to guide therapists in the use of cognitive restructuring in a group setting (Freeman, 1983; Yost, Beutler, Corbishley, & Allender, 1986).

Steuer & Hammen (1983) implemented one of the first investigations to report the efficacy of cognitive restructuring in a group format with older adults. Three case examples describing depressed elderly individuals outline the usefulness of a group setting with an elderly sample. Although this was not an empirical study, qualitative results indicate that the group format was beneficial. Subsequently, the efficacy of group cognitive restructuring for older adults has continued to be supported (e.g., Yost, Beutler, Corbishley, & Allender, 1986).

Cognitive restructuring exercises and cognitive distortion categories employed in the present author's research were adapted from the work of Beck (1967, 1976), Burns (1980, 1989), Ellis (1962), and Yost, Beutler, Corbishley, & Allender (1986). Exercises were utilized to teach subjects to identify, analyze, and dispute problematic cognitions. Six cognitive distortions were used in the context of memory in older adults: overgeneralizing, awfulizing, self-expectations, exaggerated self-statements, mind reading, and self-criticism.

Overgeneralizing occurs when a single negative event is seen as a never-ending pattern of defeat. For example, an older adult forgets the name of the person he is introducing. An overgeneralization would be, "I never remember people's names". Commonly used words are "all", "always", and "never".

Awfulizing is the tendency to exaggerate the negative aspects of a situation. For example, an older adult forgets to water the plants

before leaving on holiday, and when she later remembers she says to herself, "This is devastating. All of my plants will surely die". Commonly used words include "terrible", "awful", and "devastating".

Self-expectations is the exaggerated criteria of performance placed on oneself, and the tendency to compare oneself to an unrealistic view of others. For example, "I should be able to remember better than I do", or "I must remember her name". Commonly used words include "should", "must", and "have to".

Exaggerated self-statements occur when an individual exaggerates one's own importance by placing oneself in a category or under a demand that would be unrealistic for anyone else. For example, "How could I have forgotten my doctor's appointment? I have the worst memory of anyone". This masks the arrogance of the accompanying belief that, "I am one of a kind". Commonly used words which reflect this cognitive distortion include "most", "biggest", and "worst".

Mind reading is a category which is applied to the tendency to attribute negative, internal states to others. The pronoun 'you' is targeted as the cue word in such statements, and is followed by additional cues words as "feel", "think", and "believe". A mind reading statement is frequently completed with a comment that is self defeating (e.g., "You think that I am too old to learn something new and to do it well", or "You don't think I can remember to give medication to my elderly aunt, even though I used to be a nurse").

Self-criticism is often applied in response to a mistake or unpredicted and negative outcome of behaviour. Words that cue people to this pattern are global self attributions and frequently take the form

of name calling, such as "bad", "stupid", and "crazy" (i.e., "I can't remember anything. I am stupid!").

These categories are not exclusive or exhaustive, however, they are a convenient way to organize cognitive distortions so that the process of identifying and changing them may occur. It is possible that a cognitive restructuring intervention designed to foster a learning-orientation associated with adaptive behaviours, thought patterns, and affective reactions will equip individuals with adaptive coping skills as they age.

Statistical Properties of Screening and Assessment Measures

Screening Measures

Personal data sheet.

The Personal Data Sheet includes questions concerning medical history, family history, and social, educational, and cultural background. The importance of controlling or equating these factors across treatment groups is highlighted by several investigators (Blazer, 1982; Hertzog & Rodgers, 1989; West, Crook, & Barron, 1992).

Perlmutter (1978) investigated factors hypothesized to influence memory performance in older adults. The best predictors of word memory recall were study time, age, physical health ratings, and education. The best predictors of memory performance for facts were education and age. Similarly, West et al. (1992) found that age was consistently the most significant predictor of everyday memory, followed by vocabulary.

Hertzog and Rodgers (1989) measured memory performance, self-rated health, cognitive functioning, social activities, employment status, income, and educational level in a large sample (N = 1500) of adults age

20 and older, which oversampled individuals aged 60 and older. Age, health, depression, cognitive rigidity, employment status, income, and education were all correlated with memory performance. The best predictors of memory performance were age, employment status, and cognitive rigidity. Further, the effect of age on memory functioning was reduced when other explanatory factors, such as health, were controlled.

Social support has been linked to cognitive function and psychological health (Blazer, 1982; Billings & Moos, 1982). Arbuckle and her colleagues (Arbuckle, Gold, Andre, Schwartzman, & Chaikelson, 1992) found in their sample of 326 male World War II veterans that being younger, healthier, more educated, more introverted, more intellectually active, and more satisfied with social support predicted less intellectual decline. Social contact may affect cognition by alleviating the stress of isolation and loneliness, and by providing opportunity to exchange ideas for coping with daily life concerns. For example, Flynn and Storandt (1990) found that bibliotherapy alone was inferior to memory training involving a group component. Flynn and Storandt (1990) were uncertain as to whether this was due to the effect of exchange of information about memory techniques or the effect of discussion of interpersonal and affective issues.

Mental status questionnaire.

The Mental Status Questionnaire (MSQ; Kahn, Goldfarb, Pollack, & Peck, 1960) provides a rapid means of assessing degree of cognitive impairment, if any. The MSQ concentrates on cognitive aspects of mental functions and excludes questions regarding mood and general behaviour.

It is the most widely used measure of its kind (McDonald, 1986) and is frequently used in research with the elderly as a screening measure (Blay, Mari, Ramos, & Ferraz, 1991; Flynn & Storandt, 1990; Karuza, Zevon, Gleason, Karuza, & Nash, 1990; Rohling, Ellis, & Scogin, 1991). Typically subjects are screened for omission of dementia with the MSQ by correctly answering 8 to 10 items.

The MSQ has been shown to demonstrate significantly lower scores among subjects with clinical symptomatology consistent with early Alzheimer's disease than among subjects with clinical symptomatology consistent with benign senescent forgetfulness (Reisberg, Ferris, Borenstein, Sinaiko, de Leon, & Buttinger, 1986).

Center for epidemiological studies depression scale.

The Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) was used for initial screening for depressive symptomatology. The CES-D is a self-report 20 item questionnaire assessing the frequency or duration of symptoms associated with depression in the preceding week. The CES-D was developed to measure depressive symptomatology in the community and lacks emphasis on somatic symptoms of depression or distress rendering it especially valuable for investigations involving older adults for whom a confound may exist between symptoms associated with normal aging and symptoms of depression.

Reliability of the CES-D has been well demonstrated. Alpha reliability coefficients measuring internal consistency computed on field trial data among community volunteers ranged from .84 to .90

(Radloff, 1977). Barnes and Prosen (1984) report a value of .89 for their sample of family practice attenders.

The CES-D is characterized by test-retest reliabilities that are quite consistent across retesting intervals. Reliabilities estimated on the basis of two- (.51), four- (.67), six- (.59), and eight- week (.59) intervals were similar (Radloff, 1977). In a more recent study, test-retest reliability after a 3 month interval was .63 (Devins, Orme, Costello, Binik, Frizzell, Stam, & Pullin, 1988). While these values are low, they may reflect the test's focus on state depression (i.e., depressive symptoms having occurred during the preceding one-week interval only).

The validity of the CES-D has also been well demonstrated. Convergent validity has been demonstrated between the CES-D and two other widely used depression scales - the Hamilton rating scale (with coefficients from .50s to .80s across various psychiatric groups) and the Raskin scale (with coefficients ranging from .30s to .80s; Radloff, 1977).

The CES-D does not appear to be a "pure" indicator of depression but rather reflects psychological distress in general in addition to depressive symptomatology in particular. For example, CES-D scores were significantly correlated with total scores on the Symptom Check List-90 (Derogatis, Lipman, & Covi, 1973), a general screening measure that assesses nine independent psychiatric symptoms. While the symptoms covered by the CES-D Scale may be considered depressive in nature, they are not limited to the category of clinical syndromes of depression.

Factor analysis of the scale has produced four factors (i.e., depressed affect, positive affect, somatic and retarded activity, and interpersonal) with eigenvalues greater than 1.0, collectively accounting for 48 percent of the total variance among a group of community volunteers (Radloff, 1977). Devins et al. (1988) reported a similar factorial composition among five groups that differed in their relative physical health.

The CES-D has been used with older adults (e.g., Comstock & Helmsing, 1976; Eaton & Kessler, 1981; Himmelfarb & Murrell, 1983; Murrell, Himmelfarb, & Wright, 1983). Validity and reliability measures of the CES-D are comparable to younger samples indicating consistent results across a varied age range. Demographic variables and physical health do not influence scores differentially across age.

Wechsler adult intelligence scale-revised-vocabulary.

Intellectual level was estimated by the Vocabulary subtest of the Wechsler Adult Intelligence Scale-Revised (Wechsler, 1981) which is commonly used as an estimate of verbal intelligence in the memory and aging literature (Rissenberg & Glanzer, 1986; Rebok & Balcerak, 1989; West et al., 1992; Yesavage, Sheikh, Tanke, & Hill, 1988).

The importance of controlling for verbal intelligence on memory training outcome across groups was demonstrated by Schaffer and Poon (1982). Subjects with high verbal intelligence performed better on memory tests than those who scored lower on verbal intelligence. Similarly, West et al. (1992) demonstrated that vocabulary was the second most significant predictor of memory performance, just behind age.

Reliability was determined for the Vocabulary subtest on a sample of 320 persons (n = 160 males and n = 160 females) between 65 and 74 years (Wechsler, 1981). Split-half procedures on the Vocabulary subtest resulted in a reliability coefficient of .95. The standard error of measure was between .58 and .68 scaled-score units. The Vocabulary subtest also has an intercorrelation with the Full Scale Score of .81 to .84 for this same age group. Factor analytic and relational studies have attested to the validity of the Vocabulary subtest (Cohen, 1957; Zimmerman & Woo-Sam, 1973).

Assessment Measures

Guild memory test.

The Guild Memory Test (Gilbert, Levee, & Catalano, 1981) is an individually administered test which requires approximately 15 to 20 minutes to measure six memory functions. These memory functions are: initial recall of meaningful verbal material (average of two initial recall of two paragraphs), delayed recall of meaningful verbal material (average of retention of the previously mentioned paragraphs), retention of newly formed associations (delayed recall of previously mentioned paired associates), immediate rote memory or initial concentration (digit span forward and reverse), and non-verbal memory (recall of numbers originally presented in a series of designs).

The test was originally standardized on 834 subjects from the age of 20 to 75 years. However, those persons in their sixties and seventies were of better than average intelligence. Therefore, norms for these age groups were restandardized with a population of average intelligence (i.e., 109 subjects in their sixties and 84 subjects in

their seventies). Gilbert et al. (1981) verified equivalence and reliability of two forms of the Guild Memory Test, each consisting of nine subtests. To test their parallel value, 116 individuals between the ages of 20 and 34 years were examined on a second form, Form B. Each individual's score deviation from the mean of his/her vocabulary level on Form A was then computed for each test and the mean and standard deviation of the entire group computed for each test. No statistically reliable differences between Form A and Form B were found. To further assess the interchangeability between Form A and Form B, 20 subjects were given Form A and 20 subjects were given Form B. Each was then given the alternate form. Correlation results were between .89 to .97 on all subtests. Score similarity on Forms A and B, and score correlations of the 40 subjects suggest high reliability of the separate tests. Reliability could not be confirmed through repetition of the memory tests, since repetition would constitute a learning situation.

Validity of the Guild Memory Test has been supported. Subtests of the Guild Memory Test were chosen from the vast experimental literature pertaining to memory tests. Several subtests adapted from the Wechsler Memory Scale (1945) were used in the Guild Memory Test. These subtests were memory for paragraphs (Terman & Merrill, 1960), memory for designs (Benton, 1955), paired associates (Hunt, 1943), and digits forward and backward.

The Guild Memory Test was chosen over the Wechsler Memory Scale (WMS; 1945) in the present study for several reasons. The WMS results in a single global score (Mental Quotient) by combining scores on diverse memory functions, whereas the Guild Memory Test allows

investigators to analyze each memory subscale. In light of the multidimensional nature of memory, the Guild Memory Test scoring format is more accurate and informative. Further, the WMS includes in its Memory Quotient measures of cognitive abilities other than memory deemed unnecessary in the present study, such as personal and current information, mental tempo, and orientation.

Subtests of the Guild Memory Test are frequently used to assess memory abilities of older adults in treatment studies (Poon, 1986). For example, Steuer and Hammen (1983) used the Guild Memory Test to determine an initial profile of each subject involved in a cognitive behavioural group therapy for depressed elderly.

Supermarket test.

The Supermarket Test (Read, 1987) is a test of immediate and delayed episodic memory (i.e., information about events or circumstances). It includes episodic recall of spatial information as well. Episodic memory is memory about temporally dated events and relations among the events (Tulving, 1972). This measure has been normed on a sample of 734 individuals over the age of 50 years (Read, 1987), although these norms were not used in the present study.

A pilot study was implemented prior to the present study to determine the equivalence of three forms of the Supermarket Test. The original sixteen items in each of the three forms were chosen by interviewing two managers with at least 20 years experience in two major supermarkets in the Calgary area. The managers were asked to list the most common foods that older adults buy at the grocery store. The top 48 items were randomly assigned to Forms A, B, or C.

Twenty subjects between the ages of 67 and 76 (6 males and 14 females) were screened for physical and psychological disorders associated with cognitive decline. Those individuals to pass the screening criteria were matched for verbal intelligence and randomly assigned to one of three groups. Each group then received either Form A, B, or C individually in his or her home. An alternate form was given 10 weeks later, and the remaining form, given 9 weeks thereafter. Therefore, five subjects were given the forms in the following order: A, B, then C. The next five were given Forms: B, A, then C. The next five subjects were given Forms: C, A, then B. The last five subjects were given Forms: C, B, then A. Analyses of variance were employed to determine significant differences between the Forms A, B, and C. No significant differences were evident ($p \leq .01$) between Forms A, B, and C.

Metamemory in adulthood instrument.

This measure adapted 41 items from the Metamemory in Adulthood Instrument (MIA; Dixon & Hultsch, 1983a) which is a 108-item multiple factor instrument designed to measure individuals' perceptions of their own memory. The scales included are: Change (i.e., perception of memory abilities as generally stable or subject to long-term decline); Anxiety (i.e., feelings of stress related to memory performance); and, Locus (i.e., perceived personal control over remembering abilities). These three scales are contained within the factorial domain and referred to as memory self-efficacy. The subscales are internally consistent (i.e., Cronbach's alpha range across multiple samples equal .61 to .92) and factorially valid (Dixon & Hultsch, 1983a). The MIA has been used in many studies investigating metamemory correlates of memory performance

(e.g., Cavanaugh & Murphy, 1986; Dixon & Hultsch, 1983a, 1983b; Dixon, Hertzog, & Hultsch, 1982; Hertzog, Dixon, & Hultsch, 1990; Hertzog, Hultsch, & Dixon, 1989; Weaver, 1989).

Construct validity of the MIA has been documented. Hertzog, Hultsch, and Dixon (1989) delineate a distinction between knowledge about memory and memory self-efficacy. Consistent with Bandura's perspective (1986), memory self-efficacy can be defined as beliefs about one's own capability to use memory effectively in various situations (Hertzog et al., 1989).

Convergent validity of the MIA and the Memory Functioning Questionnaire (MFQ) has been demonstrated (Hertzog et al., 1989). Confirmatory factor analysis showed that each instrument yielded a factor labelled memory self-efficacy with approximately a .9 factor correlation.

Memory controllability inventory.

The Memory Controllability Inventory (MCI; Bandura, Elliott, Weaver, & Lachman, 1992) distinguishes between the view of memory as an uncontrollable entity that shrinks over time versus a view of memory as a controllable function that can be improved. Bandura and her colleagues (Bandura, et al., 1992) were interested to determine how these views might interact with perceived ability to affect memory functioning.

The present study employed an early version of the MCI. This measure consists of seven dimensions: a) General - items worded with reference to people in general about memory controllability (8 items); b) Personal - items worded with reference to oneself about memory

controllability (8 items); c) Strategy - belief that memory can be maintained through strategies (6 items); d) Effort - belief that memory can be maintained through effort (6 items); e) Independence - belief that memory can be maintained independently (4 items); f) Specific - belief that memory losses are specific, not global (4 items); and g) Alzheimer's - disagreement with the belief in the inevitability of Alzheimer's disease (4 items).

The more recent version of the MCI (Bandura, et al., 1992) contains two dimensions. The first dimension is Perceived Ability and includes two subscales: Present Capacity (4 items) and Potential Improvement (3 items). The second dimension is Perceived Control, and also includes two subscales: Effort (3 items) and Inevitable Decrement (3 items). Further, the MCI measures two concerns about aging that are related to beliefs about memory controllability: a) concern about independently managing memory problems (3 items), and b) the fear of developing Alzheimer's disease (4 items). Ratings are made on 7-point Likert scales ranging from strongly disagree to strongly agree.

Scale reliabilities were assessed in three samples of adults (Bandura et al., 1992). The first sample included 140 adults ($\underline{M}$ = 69.43 years, SD = 5.70), the second sample included 208 adults ($\underline{M}$ = 72.70 years, SD = 6.55), and the third sample included 162 subjects between the ages of 20 to 90 ($\underline{M}$ = 53.30, SD = 22.15). The mean educational levels for all three samples were between 14.77 and 15.89 years. The MCI subscales demonstrated acceptable high internal and test-retest reliabilities. Bandura et al. (1992) conducted average coefficient alphas across the three samples of adults: Capacity = .71, Improvement =

.69, Effort = .70, and Inevitable Decrement = .68. The MCI demonstrated convergent validity with the following measures: Personality in Intellectual Contexts Control Scales (Lachman, 1986), Rosenbaum's Self-Control Schedule (1980), and memory performance (Bandura, et al., 1992).

Memory goal scale.

The Memory Goal Scale (Elliott & Lachman, 1989b) is designed to assess learning-oriented goals and performance-oriented goals with respect to memory. Respondents with a performance-orientation see memory capability as an entity that automatically deteriorates with age and believe that there is little that can stop the deterioration. Those with a learning-orientation see memory as multifaceted and as possible to improve through effort.

Theoretical and empirical evidence for these constructs have developed from investigations in achievement motivation and performance (Bandura, 1988; Elliott & Dweck, 1988; Diener & Dweck, 1978, 1980; Weiner, 1982, 1985). Elliott and Lachman (1989) developed the Memory Goal Scale used in the present study to assess learning-oriented and performance-oriented goals with respect to memory. This scale was chosen due to its theoretical relation to the memory and aging literature (Elliott & Lachman, 1989), although its statistical properties need further investigation.

Endler multidimensional anxiety scale-state.

The Endler Multidimensional Anxiety Scale-State (EMAS; Endler, Edwards, Vitelli, & Parker, 1987) is a self-report, paper and pencil measure of state anxiety consisting of 20 items. Ten items measure the autonomic-emotional component of state anxiety and ten items measure the

cognitive-worry component of state anxiety. Scores on these two subscales are summed to provide a total state anxiety score. The items relating to the two components are randomly distributed within the form to control for order effects. Each item is rated on a 5-point scale. The E-MAS may be repeated on many occasions to assess changes in the subject's transitory levels of state anxiety.

The coefficient alpha reliabilities range from .82 to .91 for the two subscales, and from .89 to .94 for the total EMAS-State suggesting a high level of internal consistency. Principal component factor analyses (Varimax rotation) of the 20 items were computed and the three factors most strongly evident were: overall state anxiety, a cognitive-worry factor, and an autonomic-emotional factor. The factorial analyses supported the multidimensionality of the EMAS-State. Concurrent validity has been demonstrated by a significant correlation between the EMAS-State and the State-Trait Anxiety Inventory (Spielberger, 1983), a widely used unidimensional measure of state anxiety.

Geriatric depression scale.

The Geriatric Depression Scale (GDS; Sheikh & Yesavage, 1986) is designed specifically for rating depression in the elderly. The GDS was used in this study to determine changes, if any, in levels of depressive symptomatology after memory training.

The original form of the GDS was developed and validated in two phases (Brink, Yesavage, Owen, Heersema, Adey, & Rose, 1982; Yesavage & Brink, 1983). In the first phase, 100 questions were selected and tested for their potential for distinguishing older adults with depression from those without depression. Thirty of the 100 questions

with the highest correlation with depression were chosen to be included in the final version.

In the second phase of validation, two other depression scales were compared with the GDS: the Zung Self Rating Scale for Depression (Zung, 1965) and the Hamilton Rating Scale for Depression (Hamilton, 1967). All three scales were found to be internally consistent, reliable, and valid as depression measuring scales for older adults. Convergent validity between scales were found to be statistically significant at or beyond the .001 level. The GDS demonstrates test-retest reliability of $r = .94$.

The GDS has also been successfully employed to determine treatment effects of depression in the elderly. Salamon (1986) used the GDS to assess changes in a geriatric population in a long-term care setting undergoing psychotherapy over a one year period. In another study, there was a significant improvement of depression scores, as measured by the GDS, in alcoholics undergoing treatment at the Veterans Administration Medical Center in Palo Alto, California (Yesavage, 1986).

The GDS possesses concurrent validity and sensitivity to change equivalent to the Beck Depression Inventory with mildly depressed older adults (Scogin, 1987). Further, the true-false format of the GDS provides a simple task for older adults and takes only a few minutes to complete, whereas the Beck Depression Inventory requires the respondent to choose among four options which proves to be potentially confusing and time consuming.

The psychometric properties of the GDS and the Zung Self-Rating Depression Scale were evaluated and compared using an elderly community

sample (Dunn & Sacco, 1989). The results of the study support the reliability and validity of the GDS with an elderly community population. However, the GDS was found to be superior to the Zung Self-Rating Depression Scale in terms of noncompletion rate. The multiple-choice format of the Zung was more difficult for the older subjects than the true-false format of the GDS.

Cappeliez (1989) investigated sensitivity of the GDS to a social desirability response set (i.e., the tendency to respond to items on the basis of judgements of desirability/undesirability of item content). Social desirability may lead older adults to under-report depressive symptoms. There was no association between GDS scores of 30 community dwelling older adults and the Marlowe-Crowne Social Desirability Scale (Crowne-Marlowe, 1960).

All assessment measures were selected on the basis of their statistical properties, prior use with older adults, and ability to accurately and efficiently measure the dependent variables.

Chapter Conclusions

Studies reviewed in this chapter support the assertion that as people age they are increasingly prone to evaluate their memory capacities and functioning negatively and less likely to try to improve them. Older adults are especially vulnerable to the belief in memory as an uncontrollable attribute that declines with age (Hultsch et al., 1985; Lachman, Baltes, Nesselroade, & Willis, 1982; Ryan, 1992). Further, poor performance on one memory task is seen by many older adults as indicating deterioration in all aspects of memory. Therefore, any memory decline would be met with low persistence in the search for

compensatory strategies. These beliefs would predispose older adults to become less confident in their ability to successfully approach and complete memory tasks and, therefore, become more performance-oriented with respect to memory function. This performance-oriented approach and low perceived ability combination is especially likely to hinder optimal memory performance.

A cognitive restructuring intervention might instill a learning-orientation approach towards memory function by helping the elderly critically evaluate the belief that memory is irreversibly declining, and by promoting a view of memory as controllable and improved through effort. In this way, older adults experiencing memory problems may actually increase effort in a search for compensatory strategies. The elderly individual may take an approach that is associated with seeking behaviours, thought patterns, and affective reactions that will enhance memory performance.

Research Hypotheses

The following hypotheses were tested in the present memory research study:

Hypothesis 1 predicted that overall the Cognitive Restructuring Memory Training Group subjects would score significantly higher on memory performance measures than the Traditional Memory Training Group subjects.

Hypothesis 2 predicted that the Cognitive Restructuring Memory Training Group subjects would score significantly higher on memory performance measures at posttest than at pretest, and that the Cognitive Restructuring Memory Training Group subjects would score significantly

higher than the Traditional Memory Training Group subjects on memory performance measures at posttest.

Hypothesis 3 predicted that the Cognitive Restructuring Memory Training Group subjects would sustain memory performance gains at follow up (conducted 9 weeks after posttest), and that the Cognitive Restructuring Memory Training Group subjects would score significantly higher than the Traditional Memory Group subjects on memory performance measures at follow up.

Hypothesis 4 predicted that overall the Cognitive Restructuring Memory Training Group subjects would score significantly lower on anxiety and depressive symptomatology measures than the Traditional Memory Training Group subjects.

Hypothesis 5 predicted that the Cognitive Restructuring Memory Training Group subjects would score significantly lower on anxiety and depressive symptomatology measures at posttest than at pretest, and that the Cognitive Restructuring Memory Training Group subjects would score significantly lower than the Traditional Memory Training Group subjects on the affective measures at posttest.

Hypothesis 6 predicted that the Cognitive Restructuring Memory Training Group subjects would sustain posttest levels of anxiety and depressive symptomatology measures at follow up (conducted 9 weeks after posttest), and the Cognitive Restructuring Memory Training Group subjects would score significantly lower than the Traditional Memory Training Group subjects on the affective measures at follow up.

Hypothesis 7 predicted that overall the Cognitive Restructuring Memory Training Group subjects would score significantly higher on

beneficial memory perception measures than the Traditional Memory Training Group subjects.

Hypothesis 8 predicted that the Cognitive Restructuring Memory Training Group subjects would score significantly higher on beneficial memory perception measures at posttest than at pretest, and that the Cognitive Restructuring Memory Training Group subjects would score significantly higher than the Traditional Memory Training Group subjects on beneficial memory perception measures at posttest.

Hypothesis 9 predicted that the Cognitive Restructuring Memory Training Group subjects would sustain gains in beneficial memory perception measures at follow up (conducted 9 weeks after posttest), and that the Cognitive Restructuring Memory Training Group subjects would score significantly higher than the Traditional Memory Training Group subjects on beneficial memory perception measures at follow up.

These hypotheses are predicated on the findings of studies (e.g., Lachman & Dick, 1987; Lachman et al., 1992; Weaver, 1990) which provide evidence that problematic attributions and control beliefs about memory in the elderly can be modified. Challenging cognitive distortions and irrational beliefs about memory in older adults may result in greater memory enhancement than the traditional approach of teaching memory strategies.

CHAPTER 3

METHODOLOGY

The overall objective of the present study was to develop an intervention program of memory enhancement for older adults. A community-dwelling sample was targeted to address a pertinent concern of older adults since a majority of elders live in the community, as distinguished from a hospitalized or institutionalized sample.

Recruitment of Subjects

Step 1. Initial contact was sought through (see Appendix A):

- seniors' clubs and organizations,
- seniors' newsletters,
- a city newspaper,
- a seniors' magazine,
- advertising through a local cable television station,
- coordinators of seniors' lodges and apartment complexes in four quadrants of the city, and
- bulletin board postings in public libraries.

Several organizations requested research proposals before any contact was made with their members, six requested that the researcher deliver a personal invitation to the group, ten requested that posters be displayed, and five seniors' organizations declined the request for participation.

Step 2. Interested persons contacted the researcher by telephone and an initial screening was conducted. The caller was informed about the logistics of the classes and the research assessments. This included:

- location, starting date, length of class,
- brief overview of the research and class content, and
- a specification of the time commitment involved in number of hours over a 10 week period of memory classes.

Inclusion Criteria Used at Time of Initial Screening were as Follows:

- interested volunteer was between 65 and 76 years,
- had dependable transportation to and from class, and
- was agreeable to the time commitment for the classes.

Exclusionary Criteria:

Any volunteer self-reporting a medical diagnosis of dementia, severe physical constraints, or psychopathology was excluded from the study sample. Volunteers were excluded if they reported suffering from physiological conditions listed in Table 2 (Dahl, 1983). Confirmation was sought whenever possible from attending spouse or family member. This exclusion criterion was based on the assumption that secondary complications from a physiological condition may result in cognitive decline.

Step 3. If volunteers satisfied the conditions in Step 2, the researcher or a trained assessor met with the potential subject to complete a screening and assessment (see Appendices B and C).

Description of Subjects

There were approximately 300 inquiries from individuals in the community about the memory enhancement research. Subjects who were finally accepted for the memory training were 158 community-dwelling

Table 2

Physiological Causes of Cognitive Decline

- Vascular Causes
  - Hypertension
  - Cerebral Vasculitis
  - Cerebral Emboli
- Space-occupying Lesions
  - Tumour
  - Abscess
- Toxic Causes
  - Medications
  - Alcohol
- Metabolic Causes
  - Hypothyroidism
  - Organ Dysfunction
    - Hepatic
    - Renal
    - Pulmonary
    - Cardiovascular
  - Electrolyte Imbalance
- Nutritional Causes
  - Vitamin B12 Deficiency
  - Niacin Deficiency
  - Thiamine Deficiency (Korsakoff's Syndrome)
- Infections
  - Neurosyphilis
  - Tuberculosis
  - Crypotococcosis
- Specific Neurologic Syndromes
  - Alzheimer's Disease
  - Parkinson's Disease
  - Wilson's Disease
  - Huntington's Disease
  - Multiple Sclerosis
  - Cerebral Amyloid Angiopathy
  - Pick's Disease
  - Creutzfeldt-Jakob Disease
  - Cerebrocerebellar Degeneration
  - Marchiafava-Bignami Disease
  - Hydrocephalus

older adults between the ages of 65 and 76 years and who lived in the Calgary area. Valid data (i.e., missed three or fewer memory classes and contributed posttest and/or follow up data) was collected from 117 of these subjects (34 males; 83 females) over a period of 18 months (see Table 3).

Although all 158 participants volunteered for the study, their attention was drawn to the study from a variety of advertising sources: forty-seven of the 117 subjects (40.2%) learned of the memory classes through seniors' newsletters, forty-five (38.5%) through the city newspaper, ten (8.5%) from personal contact, eight (6.8%) through bulletin boards, six subjects (5.1%) through oil company newsletters, and one person (.9%) from watching a local cable television advertisement.

Subjects selected for Wave I of the study volunteered their participation during the first 8 weeks of advertising. Forty subjects were matched for verbal intelligence using the Vocabulary subtest of the WAIS-R as recommended by Gilbert, Levee, and Catalano (1981). Subjects were considered to be matched when they scored within one standard deviation of the each other. Each was randomly assigned to one of two groups (i.e., Traditional Memory Training Group or Cognitive Restructuring Group). This procedure was repeated consecutively within a one year period for subjects assigned to Wave II, Wave III, and Wave IV (see Tables 4 and 5). A list of volunteers interested in participating in the next wave of classes was accumulated, although the volunteers were also encouraged to contact the researcher following

Table 3

Volunteer Participation and Attrition

Inquires Made Regarding Memory Research	300
Volunteers Who Did Not Meet the Criteria	40
Volunteers Who Proceeded With Pretest Assessment	158
Subjects Who Dropped Out or Were Excluded After Commencement of the Memory Training Classes	41
Valid Data Collected From Subjects Who Completed Posttest and/or Follow Up Assessments	117

Table 4

Research Design

Wave I	Wave II	Wave III	Wave IV
CRG and TMG Subjects	CRG and TMG Subjects	CRG and TMG Subjects	CRG and TMG Subjects
Time 1 Assessment	Time 1 Assessment	Time 1 Assessment	Time 1 Assessment
Time 2 Assessment	Time 2 Assessment	Time 2 Assessment	Time 2 Assessment
Time 3 Assessment	Time 3 Assessment	Time 3 Assessment	Time 3 Assessment

Table 5

Number of Subjects Assessed in Each Wave

	Wave I		Wave II		Wave III		Wave IV	
	C	T	C	T	C	T	C	T
Pretest	14	16	20	17	19	18	17	19
Posttest	10	15	13	13	17	15	16	17
Follow Up	8	13	9	14	15	15	13	11

Note. CRG = C = Cognitive Restructuring Group. TMG = T = Traditional Memory Training Group.

several weeks. Consistent proportions of men and women were assigned in each group for a ratio of 3:1.

Sociodemographic Characteristics

Every effort was made to ensure that the sample selected for each wave of the study included adequate representation with respect to the following: 1) residential status, 2) living arrangement, 3) marital status, 4) level of education, 5) socioeconomic status, and 6) geographical distribution. The sample selected for the study was comparable with the Calgary Civic Census (1986, 1989) with respect to educational level, marital status, living arrangement, and geographical distribution for persons between the ages of 65 and 74 living in noninstitutional settings (see Tables 6 - 9). Overall, the research sample closely represents the senior population in the Calgary area and a neighbouring city of similar size (Edmonton Civic Census, 1989).

However, the educational level of the research sample included fewer elementary and more secondary level individuals than the overall senior population in Calgary (see Table 6). This implies that the study sample was somewhat better educated than the overall senior population residing in Calgary. The generalizability of the findings in the present study is limited to community-dwelling, well-educated samples.

There were fewer married subjects and more separated and divorced subjects in the research sample than the overall senior population of Calgary (see Table 7). In the study sample and the Calgary area, most seniors live with their spouse or alone, respectively (see Table 8).

Table 9 includes the 1989 Calgary Civic Census geographic distribution of seniors divided by quadrants of the city of Calgary

Table 6

Educational Level

	Research Sample	Calgary area 1986
	%	%
Elementary	8.5	25
Secondary	53.0	37
Post Secondary	38.5	38

Table 7

Marital Status

	Research Sample	Calgary area 1986
	%	%
Married	53	64
Widowed	21.3	24
Separated/ Divorced	19.7	7
Single	6	5

Table 8

Living Arrangements

	Research Area	Calgary Area
	%	%
Spouse	53.8	61
Alone	37.6	25
With Partner	4.3	3
With Family Members	4.2	8
Collective Dwelling	0	3

Table 9

Geographical Distribution

	Research Sample	Calgary Area
	%	%
SW	53.0	38.2
NW	31.6	30.8
SE	9.4	17.3
NE	6.0	13.7

(Aldred & Fung, 1989). In the research study sample and the Calgary area, the majority of seniors live in the southwest and northwest quadrants of the city. The least number of seniors live in the southeast and northeast quadrants of the city. The study sample also included the fewest number of subjects from these two quadrants.

Sociodemographic characteristics for all subjects are listed below:

Age.

Subjects ranged in age from 65 to 76 years (M = 69.3 years; Md = 68.5 years).

Marital status.

Sixty-two (53%) of the subjects were married, twenty-five (21.4%) widowed, twenty-three (19.7%) separated or divorced, and seven (6%) were single at the time of the study.

Educational level.

Sixty-two (53%) subjects had secondary schooling, forty-five (38.5%) had college or university training, and ten (8.5%) had elementary schooling.

Socio-economic status.

For the most part, all subjects were retired and not making an annual income, therefore, subjects provided subjective self-reportings of their socio-economic level. Seventy-six (65%) subjects placed themselves in the middle class, twenty-eight (23.9%) in the lower-middle class, eleven (9.4%) in the upper-middle class, and two (1.7%) in the upper class.

Living arrangement.

Sixty-three (53.8%) subjects lived with their spouse, forty-four (37.6%) lived alone, five (4.3%) lived with a partner, and five (4.2%) lived with a family member.

Residential status.

Ninety-one (77.8%) of the participants lived in a single-family dwelling and twenty-six (22.2%) lived in an apartment or multi-dwelling complex.

Contact with children and grandchildren.

At the time of the study, thirty-four (29.1%) of the subjects self-reported having contact with their children or grandchildren once a day, forty-three (36.8%) of the subjects reported having contact once a week, eight (6.8%) having contact twice a week, sixteen (13.7%) having contact once a month, and five (4.3%) having contact once a year.

Social contact.

At the time of the study, sixty-eight (58.1%) of the subjects self-reported having social contact once a day. Forty-one (35%) of the participants had social contact once a week, four (3.4%) had social contact twice a week, and four (3.4%) had social contact once a month.

Homogeneity of treatment subjects.

There were no significant differences between treatment groups on any of the following variables: 1) residential status, 2) living arrangement, 3) socioeconomic status, 4) marital status, and 5) level of education. Further, there were no significant differences between treatment groups on frequency of social and family contact. The frequency of social and family contact as reported by the subjects was recorded since adequacy of social support has been linked to cognitive function and psychological health (Blazer, 1982; Billings & Moos, 1982), especially in elderly persons. Table 10 provides the sociodemographic characteristics of the study participants classified by treatment groups.

Volunteers Excluded From the Study

Forty individuals who expressed interest in participating in the research were rejected for the following reasons (see Table 11). Twenty-five volunteers were turned away due to histories of cardiac abnormalities, hypertension, head injuries, multiple sclerosis, and pernicious anaemia. Four persons with poor vision and hearing were also excluded from the study.

Nine volunteers were referred to their family physician or Alberta Mental Health Services for possible treatment of moderate or severe depression. A score higher than 20.5 on the CES - D was used as an indicator of depression. The DSM-III-R (American Psychiatric Association, 1987) diagnostic criteria for a Major Depressive Syndrome was also consulted.

Table 10

Sociodemographic Characteristics

Chronological Age	CRG[a]	TMG[b]
M	69.5	69.1
SD	3.2	3.0

Marital Status	CRG		TMG	
	n	%	n	%
Married	29	51.8	33	54.1
Widowed	10	17.9	15	24.6
Separated/Divorced	15	26.8	8	13.1
Single	2	3.6	5	8.2
Total	56	100.0	61	100.0

Educational Level	CRG		TMG	
	n	%	n	%
Elementary	8	14.3	2	3.3
Secondary	32	57.1	30	49.2
Post Secondary	16	28.6	29	47.5
Total	56	100.0	61	100.0

Socio-economic Status	CRG		TMG	
	n	%	n	%
Lower Middle Class	20	35.7	8	13.1
Middle Class	31	55.4	45	73.8
Upper Middle Class	5	8.9	6	9.8
Upper Class	0	0	2	3.3
Total	56	100.0	61	100.0

Note. CRG = Cognitive Restructuring Group. TMG = Traditional Memory Training Group.

Table 10 (cont.)

Living Arrangement	CRG		TMG	
	n	%	n	%
Spouse	29	51.8	34	55.7
Alone	21	37.5	23	37.7
With Partner	3	5.4	2	3.3
With Family Member	3	5.4	2	3.3
Total	56	100.0	61	100.0

Residential Status	CRG		TMG	
	n	%	n	%
Single Family Dwelling	40	71.4	51	83.6
Apartments/Multi-dwelling	16	28.6	10	16.4
Total	56	100.0	61	100.0

Contact with Children/Grandchildren	CRG		TMG	
	n	%	n	%
Daily	16	28.6	18	29.5
Twice Weekly	3	5.4	5	8.2
Weekly	17	30.4	26	42.6
Monthly	11	19.6	5	8.2
Yearly	3	5.4	2	3.3
NA	6	10.7	5	8.2
Total	56	100.0	61	100.0

Note. CRG = Cognitive Restructuring Group. TMG = Traditional Memory Training Group.

Table 10 (cont.)

Social Contact

	CRG		TMG	
	n	%	n	%
Daily	33	58.9	35	57.4
Twice Weekly	1	1.8	3	4.9
Weekly	20	35.7	21	34.4
Monthly	2	3.6	2	3.3
Total	56	100.0	61	100.0

Note. CRG = Cognitive Restructuring Group. TMG = Traditional Memory Training Group.

[a] n=56 [b] n=61

Table 11

Volunteers Excluded From Research Participation

Head Injuries	3
Cardiac Abnormalities	11
Multiple Sclerosis	2
Pernicious Anaemia	1
Hypertension	8
Poor Vision	3
Severe Hearing Loss	1
Possible Depression	9
Possible Dementia	2
Total	40

Two volunteers demonstrated signs of dementia during the assessment. A score of less than 9 out of 10 on the Mental Status Questionnaire was a cursory indicator of dementia. However, more evidence was gathered when the Vocabulary subtest score was evaluated with the Guild Memory Test. A large discrepancy between the two, in favour of the Vocabulary subtest, indicated possible dementia. When signs of dementia were evident, recommendations were made to the volunteer and a family member to visit their family physician. In both cases of possible dementia, either the volunteer or a family member had suspected deterioration, and in one case physician contact had already been made.

Subjects excluded after classes began.

One hundred and fifty-eight subjects passed the screening requirements and started classes, however, data from only 117 subjects could be used. Data from 41 subjects were omitted due to one of three reasons (see Table 12): (1) Twenty subjects withdrew participation after the initial assessment and first class. Reasons given for withdrawing included illness, relocating, and concern regarding the time commitment. (2) Data from 15 subjects was excluded from the study because subjects missed more than 3 out of the 10 treatment sessions. (3) Posttest and follow up data was not collected from 6 subjects who became ill after they had completed the treatment.

Table 12

Subjects Excluded After Treatment Began

Withdrew After Initial Assessment and First Class Attendance:	
Illness	
Relocating	
Time Commitment	
Subtotal	20
Missed More Than Three Classes:	
Illness	8
Travel	1
Family Commitments	3
Cold Weather	1
Relocated	1
Lack of Interest	1
No Posttest or Follow Up Data:	
Due to Illness	6
Total	41

Screening Measures

The screening assessment package (Appendix B) given to each participant before pretest consisted of:

1. an informed consent form;
2. a personal and demographic data sheet;
3. a cognitive impairment screening;
4. a depression measure; and
5. an estimate of verbal intelligence.

Informed Consent Form

The informed consent form outlined the study, including notification that participation was voluntary and that subjects had the right to refuse participation at any time, and assurance of the confidentiality of information.

Personal Data Sheet

A Personal Data Sheet included questions concerning medical history, family history, and social, educational, and cultural background.

Mental Status Questionnaire

The Mental Status Questionnaire (MSQ; Kahn, Goldfarb, Pollack, & Peck, 1960) provided a rapid means of assessing the degree of cognitive impairment, if any. The MSQ concentrates on cognitive aspects of mental functions (e.g., attention, orientation, registration, memory) and excludes questions regarding mood and general behaviour. The measure consists of 10 orientation and information items with a score ranging from 0 to 10. Those individuals scoring below 9 out of 10 were excluded from the study for reasons of possible cognitive impairment.

Center for Epidemiological Studies Depression Scale

The Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) was used for initial screening of depressive symptomatology, since depression may adversely effect memory performance (Gibson, 1981; Raskin, 1986). The CES-D is a self-report 20 item questionnaire assessing the frequency or duration of symptoms associated with depression in the preceding week. For each item, subjects specify the frequency or duration with which they experienced a specific feature by circling a number between 0 and 3. Zero indicates the occurrence happened "rarely or none of the time" (less than 1 day); 1 indicates "some or a little of the time" (1 - 2 days); 2 indicates "occasionally or a moderate amount of time" (3 - 4 days); and 3 indicates "most or all of the time" (5 - 7 days). The scores range from 0 to 60, with higher scores reflecting greater distress. Those individuals scoring within the moderate (21-30.5) to severe (31 or higher) range were excluded from the present study for possible depression (Barnes & Prosen 1984) and referred to their physician or local mental health facility.

Wechsler Adult Intelligence Scale-Revised-Vocabulary

Intellectual level was estimated by means of the Vocabulary subtest of the Wechsler Adult Intelligence Scale-Revised (WAIS-R; Wechsler, 1981). The WAIS-R Vocabulary subtest is commonly used as an estimate of verbal intelligence in the memory and aging literature (Rebok & Balcerak, 1989; Rissenberg & Glanzer, 1986; Yesavage, Sheikh, Tanke, & Hill, 1988). The importance of controlling for verbal intelligence across groups was demonstrated by Schaffer and Poon (1982). They found that subjects with higher verbal intelligence tended to

perform better on memory tests than those who scored lower on verbal intelligence. Therefore, WAIS-R Vocabulary subtest scores were matched across groups in the present study. Subjects were considered to be matched when they scored within one standard deviation of their scaled score.

Research Instruments

The assessment package (Appendix C) given to each participant at pretest, posttest, and follow up consisted of:

1. two memory performance instruments measuring multidimensional aspects of memory function which included the Guild Memory Test (Gilbert, Levee, & Catalano, 1981) and the Supermarket Test (Read, 1987);

2. three instruments measuring various aspects of memory perception which included three subscales of the Metamemory in Adulthood Instrument (i.e., Change, Anxiety, and Locus; Dixon & Hultsch, 1983a), the Memory Controllability Inventory (Bandura, Elliott, Weaver, & Lachman, 1992), and the Memory Goal Scale (Elliott & Lachman 1989b);

3. the Endler Multidimensional Anxiety Scale - State (Endler, Edwards, & Vitelli, 1987) as a measure of state anxiety, and the anxiety subscale of the Metamemory in Adulthood (Dixon & Hultsch, 1983a) as a measure of anxiety specifically pertaining to memory function;

4. the Geriatric Depression Scale (Yesavage, Brink, Rose, Lum, Huang, Adey, & Leirer, 1983) was given as a measure of depression; and

5. on a one time only basis, questions about Premature Cognitive Commitments regarding memory and aging.

These particular assessment instruments were selected on the basis of their (1) statistical properties, (2) prior use with older adults, and (3) ability to measure adequately the dependent variables. Standardized instructions were utilized with each assessment instrument.

Guild Memory Test

The Guild Memory Test (Gilbert, Levee, & Catalano, 1981) is an individually administered test which requires approximately 15 to 20 minutes to measure six memory functions. These memory functions are: initial recall of meaningful verbal material, delayed recall of meaningful verbal material, retention of newly formed associations, immediate rote memory or initial concentration, and non-verbal memory.

For the present study, half of the subjects initially received Guild Memory Test Form A and the other half received Form B. Since the Guild Memory Test has only two forms, they were alternated for posttest and follow up assessments. Therefore, the pretest form was used also at follow up approximately 5 months later.

The Guild Memory Test was used in this study to test for changes in levels of memory performance with two types of memory treatment. The Guild Memory Test was chosen for its capacity to allow analysis of each memory subscale individually and its frequent application for assessing memory abilities of older adults in treatment studies (Steuer & Hammen, 1983).

Supermarket Test

Supermarket Test (Read, 1987) is a test of immediate and delayed episodic memory which requires between 15 to 20 minutes to administer. Sixteen well-known brands of food items were placed on a table in

specific positions on three rows. The subject named each item and estimated its cost. The subject turned his or her back to the table and recalled the name of as many items as possible. The items were then placed in random order on the table and the subject was asked to replace all of the items in their original location. Credit was given for each item replaced on its original row. Thirty minutes later, the subject was again asked to recall the names of the items. One point was given for each correctly recalled item.

For this study, half of the subjects received Supermarket Test Form A and the other half Form B. These forms were alternated for posttest, and all subjects received Form C at follow up.

The Supermarket Test was used in this study to test for changes in immediate and delayed episodic memory with two types of memory treatment. This test is particularly appropriate for an elderly sample since older adults tend to perform better on memory tasks that are personally relevant to them in comparison to their performance on meaningless memory tasks (Denney, 1989).

Metamemory in Adulthood Instrument

The researcher adapted 41 items from the Metamemory in Adulthood Instrument (MIA; Dixon & Hultsch, 1983a) which is a 108-item multiple factor instrument designed to measure individuals' perceptions of their own memory. Each question is rated on a 5-point Likert scale ranging from agree strongly to disagree strongly, and requires approximately 15 minutes to complete.

Only three of the seven dimensions of the scale were used: a) Change - perception of memory abilities as generally stable or subject

to long-term decline (18 items); b) Anxiety - feelings of stress related to memory performance (14 items); and, c) Locus - perceived personal control over remembering abilities (9 items). All three scales load on a dimension interpreted as memory self-efficacy (Hertzog, Dixon, Schulenberg, & Hultsch, 1987). A fourth scale which also loads on this dimension was not used: Capacity - beliefs about current levels of memory. Although it would have been beneficial to have information from all of the MIA scales, there were concerns as to the appropriate length of an assessment given to older adults.

The three MIA subscales were used in the present research to test for changes in perception of memory abilities as stable versus unstable, feelings of stress related to memory performance, and perceived personal control over remembering with two types of memory treatment. The MIA was also included in the present study for its frequent use in many studies investigating metamemory correlates of memory performance in older adults (e.g., Cavanaugh & Murphy, 1986; Dixon & Hultsch, 1983b; Dixon, Hertzog, & Hultsch, 1986; Hertzog, Dixon, & Hultsch, 1990; Hertzog, Hultsch, & Dixon, 1989; Weaver, 1990).

Memory Controllability Inventory

The Memory Controllability Inventory (MCI; Bandura, et al., 1992) taps a view of memory as an uncontrollable entity that shrinks over time versus a view of memory as controllable and as a function that can be improved. The scale consists of seven dimensions: a) General - items worded with reference to people in general about memory controllability; b) Personal - items worded with reference to oneself about memory controllability; c) Strategy - belief that memory can be maintained

through strategies; d) Effort - belief that memory can be maintained through effort; e) Independence - belief that memory can be maintained independently; f) Specific - belief that memory losses are specific, not global; and g) Alzheimer's - disagreement with the belief in the inevitability of Alzheimer's disease. Each question is rated on a 7-point Likert scale ranging from strongly agree to strongly disagree.

The MCI was used in the present study to measure changes in perception of memory as controllable versus uncontrollable with two types of memory treatment. Although the MCI is a relatively new measure of memory perception, it assesses a salient feature of memory functioning which may effect memory performance.

Memory Goal Scale

The Memory Goal Scale (Elliott & Lachman, 1989b) is designed to assess learning-oriented goals and performance-oriented goals with respect to memory. Subjects rate on a 7-point Likert scale concerns they would have in a situation requiring them to match names and faces of persons they have just met. Six items assess performance-orientation and five items assess learning-orientation. The scale requires approximately 10 minutes to complete.

The Goal Scale was used in the present study to test for changes in performance-orientation versus learning-orientation with two types of memory treatment. Although the scale is a relatively new measure of memory perception, it assesses a salient feature of memory functioning which may effect memory performance in older adults.

Endler Multidimensional Anxiety Scale-State

The Endler Multidimensional Anxiety Scale-State (EMAS-S; Endler, et al., 1987) is a self-report, paper and pencil measure of state anxiety which requires approximately 15 minutes to complete. The subject is asked to rate, "How do you feel at this particular moment", on a 5-point Likert scale ranging from not at all to very much. Ten items measure the autonomic-emotional component of state anxiety and ten items measure the cognitive-worry component of state anxiety. Scores on the subscales are summed to provide a total state anxiety score.

The EMAS-State was used in this study to test for changes in levels of state anxiety with two types of treatment. It was particularly useful to compare the cognitive-worry scores with the autonomic-emotional scores since the memory treatment included a cognitive change approach to memory function.

Geriatric Depression Scale

The Geriatric Depression Scale (GDS; Yesavage, Brink, Rose, Lum, Huang, Adey, & Leirer, 1983) is designed for rating depression in the elderly. The scale was used in this study to test for changes in levels of depressive symptomatology with two types of memory treatment. The yes/no format provides a simple task for older adults and takes only approximately 10 minutes to complete.

Premature Cognitive Commitment

On a one time basis only, questions regarding premature cognitive commitment (Chanowitz & Langer, 1981) were used to examine preconceived notions of memory performance of older adults evaluated by asking subjects to remember what they thought about memory in the elderly when

they were younger. All replies were written verbatim and subjects were allowed to qualify for themselves what is meant by "older" and the amount of memory loss. These questions required approximately 10 to 15 minutes to complete.

The questions regarding premature cognitive commitment were used to explore whether subjects expected developmental changes in their memory function across adulthood. Premature cognitive commitments are an important factor to consider since these beliefs may have little effect on an individual until a subsequent memory loss in middle adulthood or old age triggers the unquestioned belief that an individual has a symptom of inevitable and irreversible memory loss. This belief may result in actual memory deterioration, as beliefs affect self-conceptions and goal orientations.

Data Collection Procedures

Pretest Assessment

With the exception of three subjects, all subjects were assessed in their home setting. A complete pretest assessment using measures of memory performance, memory perception, and affective symptomatology was completed for each subject who passed the screening criteria. Each assessment took approximately two hours.

Intervention

Subjects attended 10 weeks of memory training classes requiring 2 hours every week. Each subject attended either the Cognitive Restructuring Memory Training classes (CRG) or the Traditional Memory Training classes (TMG) described later in this chapter.

Posttest Assessment

Posttest assessments were conducted after 10 weeks of memory training classes. A trained assessor met individually with the participant in his or her home and repeated the measures of memory performance, memory perception, and affective symptomatology which were initially administered during the pretest assessment.

Follow up

Follow up assessments using the same measures were conducted for each subject 9 weeks after the completion of the memory classes to assess maintenance of memory performance levels.

Qualifications of Assessors

Assessors were eight students at the university who had theoretical and practical psychological assessment training at the graduate and/or undergraduate level. There were three male and five female assessors with an age range of 23 to 50 years (M = 34 years). All assessors were blind to the hypotheses being tested and subject's assignment to treatment groups. Assessors received at least 10 hours of individual training from the researcher on the assessment measures chosen for the present study. Training involved review of basic assessment principles (Mittler, 1981) and practice employing the assessment materials. Each assessor received testing on all measures administered by the researcher as a method to become familiar with the test procedures. Then each assessor was evaluated at least twice after administering the assessment package to the researcher.

Treatment Program

Class Structure and Telephone Contact

Classes met 2 hours once a week for 10 consecutive weeks. Each class was organized in the following format:

- review questions from previous session,
- discuss assignment from previous session,
- educational component about memory,
- class break,
- Cognitive Restructuring Memory Training or Traditional Memory Training, and
- individual assignment for the week.

Each class had a component of small group exercises, individual focus on homework, group discussion, and lecture material with prepared notes distributed to each individual.

The researcher appeared at the first, fifth, and tenth class to introduce the trainer in the first session and to answer any questions that the subjects may have had thereafter. The importance of subjects' consistent attendance in all classes was emphasized.

Weekly telephone contact by the trainer was made to each subject at a prearranged time. This provided an opportunity for each subject to ask the trainer questions pertaining specifically to themselves and a time to receive clarification on memory techniques from previous classes.

Qualifications of trainers.

The trainers were two female registered nurses with many years of experience in teaching and supervision. One trainer had a Master of Adult Education Degree and several courses toward a Gerontology Certificate. Both had worked with older adults in hospital settings and were involved with seniors in their personal lives. One trainer was a senior, and the other a mature adult involved with the health and well-being of her elderly relatives. The latter trainer also worked part-time with a seniors' outreach program.

The trainers were given a list of reference material to study. This included information about memory (Poon, 1986), adult learning (Schnell, 1987), cognitive therapy with older adults (Yost, Beutler, Corbishley, & Allender, 1986), cognitive restructuring (Beck, 1967; Beck, Rush, Shaw, & Emery, 1979; Burns, 1980; 1989), memory improvement techniques (Gosi & Levi, 1985), cognitive functioning in older adults (Poon, Fozard, Cermak, Arenberg, & Thompson, 1980), dealing with difficult behaviour in group settings (Schnell, 1987), and the effects of sensory deficits and communication (Fry, 1986). The researcher met with each trainer on numerous occasions to discuss this material. Then content material for each class was discussed and all questions answered. Once classes began, weekly contact was kept with the trainers. Debriefing events of the previous class, review, and clarification of the next class was conducted.

To avoid trainer effects, two trainers taught four different groups out of a total of eight groups of subjects (see Table 13).

TABLE 13

Trainer Sequence for Each Wave

Wave	TMG Trainer	CRG Trainer
I	A	A
II	B	B
III	A	B
IV	B	A

Note. TMG = Traditional Memory Training Group. CRG = Cognitive Restructuring Group.

Trainer A taught both classes in Wave I, and Trainer B taught both classes in Wave II. Since both trainers were available for Waves III and IV, they each taught one of each treatment group. All course material was written out in explicit detail so there would be little variation between information given to the four waves of subjects. The trainers were blind to the hypotheses being tested.

Informal class evaluations were given at the end of each wave which indicated favourable feedback about the trainers (see Appendix D). Written evaluations and comments from the participants suggested that a therapeutic relationship had been established between the trainers and subjects.

Treatment Groups

Cognitive Restructuring Memory Training

Initially, individual cognitive restructuring was developed to modify belief systems associated with depression (Beck, et al., 1979; Ellis, 1962). Yost, et al. (1986) adapted the technique of individual cognitive restructuring for use with groups of older adults. This approach is especially useful in frequently seen cases where memory problems accompany depression (Kahn, Zarit, Hilbert, & Niederehe, 1975). The patient is taught to write down dysfunctional thoughts and then replace them by writing more adaptive ones. For this study, the above technique was used as a guideline for elderly persons who have episodes of forgetting and then feel helpless and discouraged.

Cognitive distortions about memory functioning in late life were adapted from Fry (1986) and the cognitive restructuring literature (Beck, et al., 1979; Burns, 1980, 1989; Ellis, 1962; Yost, et al., 1986). Cognitive distortion categories covered in the classes in reference to memory loss in old age include overgeneralizing, awfulizing, self-expectation, exaggerated self statements, mind reading, and self criticism (see Appendix E). Through class discussion, exercises, examples, individualized weekly homework, and individual weekly telephone contact with the trainer each subject was able to discern which type of cognitive distortions and cognitive restructuring strategies were most pertinent to him or her.

Therefore, a treatment approach adapted from cognitive therapy, cognitive-behavioral therapy (Beck, 1967; Beck, et al., 1979; Burns, 1980, 1989; Ellis, 1962), and group therapy for older adults (Yost, et

al., 1986) was implemented in the Cognitive Restructuring Memory Training group. This approach contained the following stages:

a) Older adults identified automatic thoughts that preceded their anxiety and depression related to the belief that aging leads to cognitive decline.

b) Subjects recorded these automatic irrational or dysfunctional thoughts, the situation where these thoughts occurred, and the feelings associated in the precipitating event.

c) Each dysfunctional thought was classified into a category of cognitive distortions previously delineated by cognitive theorists to demonstrate the value of restructuring dysfunctional thoughts (Beck, 1979; Burns, 1980, 1989).

d) A rational response was given by the subject to the automatic thought. Behavioral and emotional outcome was then recorded.

The Cognitive Restructuring Memory Training subjects also focused on concepts from the literature on self-efficacy (Bandura, 1977, 1982, 1988), attribution retraining (Forsterling, 1985; Weaver, 1990), control and aging (Baltes & Baltes, 1986; Fry, 1989b; Lachman, Steinberg, & Trotter, 1987), and self-conceptions of aging (Elliott & Lachman, 1989a; Lachman & Dick, 1987). Specifically, this included:

a) informing the older adult subjects about memory as a shrinking entity versus a controllable attribute,

b) advocating memory as controllable through effort,

c) discussing how these beliefs influence people's orientation toward memory tasks,

d) training in self-instructional techniques that support a learning-orientation toward memory tasks,

e) generating examples and sharing with others one's own experience of forgetting and how it was overcome or dealt with in a beneficial way, and

f) encouraging participants to apply memory strategies to everyday situations.

The training strategies and techniques for learning cognitive restructuring included small group activity, role-playing, performance-oriented and learning-oriented responses, index card prompts, and oral point-counterpoint. Group discussion, under the guidance of a trainer, was used with these strategies and techniques to dialogue about different views of memory. These views included the subject's perception of memory, how people with equal ability but different perceptions of memory might approach memory tasks, and the effects of these orientations on memory functioning. Detailed descriptions of each treatment session may be found in the Cognitive Restructuring Memory Training Manual. Below are components of the cognitive restructuring memory training approach.

Role-play.

Two scripts comprising two elderly persons were role-played in front of the class (see Appendix F for the role-play scripts). It was explained to the subjects that the two women depicted had scored equally well on IQ and ability tests. During the role-play it became evident that one believed memory declines with aging, whereas the other believed she could exercise some control over her memory. Then each of these

women was given a memory task and encountered failure. This exemplified the patterns of affect, thought, and behaviour associated with memory beliefs, and served as a basis for discussion regarding perceptions of memory and their effects.

Performance-oriented and learning-oriented self-statements.

Participants generated performance-oriented and learning-oriented responses to memory tasks in a group format which provided subjects with the opportunity to identify thoughts and reactions that are associated with these different orientations (see Appendix G for examples of learning-oriented and performance-oriented statements). From this, material was generated to reflect learning-oriented coping responses. This served as a vehicle for advocating a problem-solving focus and persistence in overcoming memory difficulties.

This exercise was initially employed during the memory classes in a group format. Subjects then identified and wrote down performance-oriented statements and replaced them with learning-oriented statements at home, and brought them back to the next class for discussion.

Index card prompts.

Subjects were instructed to write down thoughts at home when they became aware of forgetting something. The subject would then identify these thoughts as performance-oriented or learning-oriented, and replace performance-oriented with learning-oriented thoughts. Index cards with learning-oriented prompt questions were utilized as a guide to generate adaptive responses for reference during future experiences of forgetting.

Oral point-counterpoint.

An oral point-counterpoint technique was employed. Subjects divided into small groups and one participant elicited a list of typical thoughts that he or she experienced during a memory loss incident. The subject was then asked to read one of the performance-oriented thoughts and another subject in the group would counter with a learning-oriented thought. Once the subject finished the list, the roles were reversed (see Appendix H for an example of oral point-counter point). This encouraged all subjects to actively engage in generating learning-oriented thought.

Traditional Memory Training

The traditional memory training classes focused on strategies traditionally used in memory training programs. Each technique was introduced and practised in class using a variety of modalities comparable to the cognitive restructuring memory training classes. Then subjects received assignments to practice the techniques at home until the next class. The ten traditional memory training classes covered the following: name recall and visualization, method of loci, peg word system, link or chain system, lists, routines, drills, practical strategies (e.g., appointment books, calendars), and other mnemonic strategies (i.e., alphabetic cuing, alphabetic searching, first letter cuing, acronyms, rhymes, patterns, and sayings). Detailed descriptions of each treatment session may be found in the Traditional Memory Training Manual.

Educational Component of the Treatment Program

Community-dwelling older adults taking a memory course have certain expectations concerning the type of material covered, such as causes of forgetting, "tricks" to remember better, and the effects of lifestyle on memory. To guard against high attrition, basic information about memory was included as an educational component for all treatment groups. Further, the educational component of the treatment provided all subjects with an opportunity to obtain basic educational information about memory abilities and memory functioning.

The educational component included: theories of forgetting, how memory works, Alzheimer's disease and other causes of memory decline, nutrition and memory, recreational drugs and memory, medications and memory, sleep and memory, and physical activity and memory. The topics were covered in fairly general terms. (Refer to the memory training manuals for further information on each topic.)

Ethical Considerations

The present research was examined and approved by the department of Educational Psychology Ethics Review Committee and the Education Joint Research Ethics Committee at the University of Calgary. Adherence to the Canadian Code of Ethics for Psychologists (1991) was a priority at every stage of the research. The Informed Consent Form (see Appendix B) addressed the right to freedom of consent and withdrawal at any time, privacy of information, and confidentiality of assessment results. Anonymity of subjects was ensured by the following precautions: a) each name was cross-referenced with a number under which all data for the subject was filed, b) names and addresses were not mentioned in any

written or oral report, and c) names and addresses were destroyed on the completion of the study. Further, the Informed Consent Form gave information about aims and methods of the research, detailed nature of subject involvement, and claimed no guarantees that the techniques used in the research would be successful.

Another ethical consideration was the age restriction of research participants. Potential benefits of a memory training program was limited to those between 65 and 76 years, although several inquirers were well beyond the age limit. The decision to include subjects in this age range was predicated on the assumption that persons between 65 and 76 years are usually retired. Further, attrition due to illness and death are less for those in this age range than if the age limit was extended to an older sample. This age group was also broad enough to encompass the number of subjects necessary for completion of the study in a reasonable period of time.

A third ethical consideration was the appropriate procedure to follow when cognitive deterioration was evident during screening procedures resulting in ineligibility for the research. In all cases, the primary researcher personally approached the volunteer and a family member to discuss the desirability for the volunteer to seek a medical assessment.

Lastly, subjects expressing an interest in receiving information about their memory functioning at the completion of the study were contacted and given verbal feedback by the principle investigator.

Statistical Treatment of the Data

The Effects of Two Types of Intervention Programs for Memory Enhancement:

1) Traditional Memory Training (TMG), and

2) Cognitive Restructuring Memory Training (CRG)

Dependent Variables Include:

1) memory performance as measured by:

- the Guild Memory Scale
- the Supermarket Test

2) memory perception as measured by:

- the Metamemory in Adulthood Instrument (Locus, Change, and Anxiety subscales)
- the Memory Controllability Inventory
- the Memory Goal Scale

3) affective symptomatology as measured by:

- the Endler Multidimensional Anxiety Scale-State
- the Geriatric Depression Scale

4) Premature Cognitive Commitment (one time only)

The BMDP Statistics Software (Dixon, 1985) was used to calculate three preliminary 2 (Treatment: CRG, TMG) X 2 (Sex: Male, Female) X 3 (Pretest, Posttest, Follow up) X 4 (Wave: I, II, III, IV) repeated measures multivariate analyses of variance (MANOVA).

1. The first 2 X 2 X 3 X 4 repeated measures MANOVA was conducted to test for significance of changes in measures of memory performance due to treatment and over time.

2. The second 2 X 2 X 3 X 4 repeated measures MANOVA was conducted to test for significance of changes in measures of memory perception due to treatment and over time.

3. The third 2 X 2 X 3 X 4 repeated measures MANOVA was conducted to test for significance of changes in measures of anxiety and depression due to treatment and over time.

Methodological stipulations for this type of analyses include assumptions of random sampling, normal distribution of the data, interval data, and homogeneity of variance. MANOVA was chosen for its ability to analyze dependent variables that may be correlated and to minimize Type I error.

Pearson Product-Moment (PPM) correlations were calculated using the Statistical Package for the Social Sciences computer program (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975) to determine associations between memory performance measures, memory perception measures, and affective symptomatology measures. Descriptive analyses were conducted to determine means and standard deviations on memory performance measures, memory perception measures, and affective symptomatology measures.

A posteriori multiple regression analyses were conducted using the Statistical Package for the Social Sciences computer program (Nie et al., 1975) to examine predictors of memory performance and affective symptomatology at posttest and follow up for two types of memory enhancement treatments. The level of confidence established a priori for all sets of statistical analyses was $p \leq .01$ to minimize Type I error.

CHAPTER 4

RESULTS

Preliminary Analyses

Descriptive analyses were conducted to determine means and standard deviations on memory performance measures, memory perception measures, and affective symptomatology measures. Tables 14 through 19 present the descriptive analyses separately for the Cognitive Restructuring Memory Training (CRG) subjects and the Traditional Memory Training (TMG) subjects at pretest, posttest, and follow up. Visual trends for these analyses are summarized below.

Table 14 demonstrates an overall increase of memory performance mean scores from pretest to posttest to follow up for the CRG subjects. Table 15 shows an increase of memory performance mean scores from pretest to posttest for the TMG, which decrease from posttest to follow up. Table 16 reveals an increase in positive beliefs about memory from pretest to posttest for the CRG subjects, with little change from posttest to follow up. Table 17 demonstrates fewer positive beliefs about memory from pretest to posttest for the TMG subjects, with less change from posttest to follow up. Table 18 shows a decrease of mean scores in anxiety and depressive symptomatology from pretest to posttest for the CRG subjects, with little change from posttest to follow up. Table 19 demonstrates an increase in anxiety and depressive symptomatology from pretest to posttest for the TMG subjects, which decreases from posttest to follow up. Refer to the repeated measures multivariate analyses of variance (MANOVA) for significant analyses on page 116 under Major Analyses.

Table 14

Means and Standard Deviations of Memory Performance for the Cognitive Restructuring Group[a]

	Pretest		Posttest		Follow up	
	M	SD	M	SD	M	SD
Guild						
Recall	6.95	3.04	8.86	2.81	9.31	2.63
Paired Associates	3.23	2.06	5.16	2.34	5.62	2.33
Digits	10.41	2.26	11.70	2.04	11.84	2.03
Designs	4.98	2.54	6.50	2.23	7.00	2.14
Retention of Paragraphs	7.66	3.78	9.70	3.36	10.40	2.98
Retention of Pairs	3.57	2.26	5.59	2.21	6.07	2.52
Supermarket						
Placed Correctly	11.98	2.79	13.63	2.36	14.18	1.75
Recall	9.36	2.48	10.88	1.96	11.13	1.96
Delayed Recall	10.88	2.82	12.38	2.76	12.69	1.95

[a] $n=56$

Table 15

Means and Standard Deviations of Memory Performance for the Traditional Memory Training Group[a]

	Pretest		Posttest		Follow up	
	M	SD	M	SD	M	SD
Guild						
Recall	6.92	2.08	7.85	2.92	7.17	2.40
Paired Associates	3.34	1.98	4.31	2.16	3.81	2.02
Digits	10.72	2.04	11.19	1.98	10.79	1.72
Designs	5.16	2.54	6.03	2.53	5.60	2.11
Retention of Paragraphs	7.25	2.97	8.14	3.76	7.90	2.84
Retention of Pairs	3.74	2.03	4.48	2.49	4.12	2.20
Supermarket						
Placed Correctly	13.07	2.20	12.86	2.58	12.58	2.01
Recall	9.67	2.40	10.44	2.19	9.56	2.10
Delayed Recall	11.84	2.44	12.22	2.36	11.25	2.35

[a] $n=61$

Table 16

Means and Standard Deviations of Memory Perception for the Cognitive Restructuring Group[a]

	Pretest		Posttest		Follow up	
	M	SD	M	SD	M	SD
MIA						
Change	63.79	9.20	53.13	10.50	53.19	8.82
Anxiety	34.45	8.10	39.10	8.22	40.13	8.03
Locus	23.29	3.62	19.88	3.05	20.69	3.62
MCI						
General	38.80	5.76	45.50	7.03	45.29	6.90
Personal	39.50	5.51	46.52	6.50	45.50	5.60
Strategy	30.07	4.92	35.40	5.12	35.78	4.83
Effort	30.63	4.70	35.45	4.53	35.31	4.01
Independence	17.18	3.70	21.57	4.53	20.98	3.84
Specific	18.00	2.92	19.75	3.11	19.53	2.70
Alzheimer's	20.18	3.82	23.84	3.63	23.33	4.18
Goal Scale						
Performance	30.86	6.36	24.68	7.82	25.69	6.73
Learning	24.14	6.70	26.82	5.12	27.23	5.97

Note. MIA = Metamemory in Adulthood. MCI = Memory Controllability Inventory.

[a] $n=56$

Table 17

Means and Standard Deviations of Memory Perception for the Traditional Memory Training Group[a]

	Pretest		Posttest		Follow up	
	M	SD	M	SD	M	SD
MIA						
Change	58.53	10.32	63.86	9.44	61.25	11.50
Anxiety	40.18	9.93	37.41	9.18	38.44	10.43
Locus	20.38	3.96	22.56	4.50	22.46	3.93
MCI						
General	42.16	7.17	39.00	7.40	39.62	7.49
Personal	43.20	7.25	39.58	6.10	40.69	7.84
Strategy	32.74	5.29	31.48	6.60	31.04	5.84
Effort	31.54	5.56	30.17	5.90	27.00	6.25
Independence	20.72	4.42	18.15	4.37	19.00	4.50
Specific	19.48	2.95	18.56	2.89	18.73	3.33
Alzheimer's	20.92	4.28	21.88	4.97	20.50	4.98
Goal Scale						
Performance	25.69	9.14	27.92	8.50	25.64	8.57
Learning	23.53	6.75	23.19	6.02	22.31	7.17

Note. MIA = Metamemory in Adulthood. MCI = Memory Controllability Inventory.

[a] $n=61$

Table 18

Means and Standard Deviations of Affective Symptomatology for the Cognitive Restructuring Group[a]

	Pretest		Posttest		Follow up	
	M	SD	M	SD	M	SD
EMAS-S						
A-E	14.88	5.92	12.64	3.70	12.77	2.86
C-W	21.52	9.49	16.64	6.12	15.36	5.03
GDS	5.23	4.34	2.80	3.12	2.80	2.78

Note. EMAS-S = Endler Multidimensional Anxiety Scale-State. A-E = Autonomic-Emotional. C-W = Cognitive-Worry. GDS = Geriatric Depression Scale.

[a] $n=56$

Table 19

Means and Standard Deviations of Affective Symptomatology for the Traditional Memory Training Group[a]

	Pretest		Posttest		Follow up	
	M	SD	M	SD	M	SD
EMAS-S						
A-E	13.02	4.85	14.95	5.19	14.42	5.86
C-W	17.80	7.36	22.49	8.01	19.45	6.86
GDS	5.00	3.79	6.51	4.32	5.35	3.58

Note. EMAS-S = Endler Multidimensional Anxiety Scale-State. A-E = Autonomic-Emotional. C-W = Cognitive-Worry. GDS = Geriatric Depression Scale.

[a] $n=61$

Using the Statistical Package for the Social Sciences computer program (1975), preliminary Pearson Product-Moment (PPM) correlations were calculated to determine associations between memory performance measures, memory perception measures, and affective symptomatology measures for all subjects at pretest. Several significant correlations were found between affective measures and memory performance measures (see Table 20):

1. Negative correlations were found between the Cognitive-Worry subscale of the EMAS-S and all subtests of the Guild Memory Scale. In addition, a negative correlation was found between the Cognitive-Worry subscale and Delayed Recall of the Supermarket Test. Thus, the overall indications are that subjects' increased cognitive worry was associated with lower memory performance scores on the measures used in this study.

2. Negative correlations were found between the Geriatric Depression Scale and two measures of memory performance from the Guild Memory Scale: Recall and Retention of Paragraphs. Thus, the overall indications are that subjects' increased depressive symptomatology was associated with lower memory performance. However, there were no significant correlations between the affective measures and the Supermarket Test.

Significant correlations were found between several memory performance measures and memory perception measures (see Table 21):

1. Positive correlations were revealed between the Anxiety subscale of the MIA and three subtests of the Guild Memory Scale (i.e., Recall, Designs, and Retention of Paragraphs) and Delayed Recall of the Supermarket Test. Since a low score on the Anxiety subscale indicates

Table 20

PPM Correlations for Affective and Memory Performance Measures At Pretest for All Subjects

	Affect		
	EMAS-S		GDS
	A-E	C-W	
Memory Performance			
Guild Memory Scale			
Recall	-.1130	-.2904**	-.2167*
Paired Associates	-.0675	-.2490*	-.1247
Digits	-.1215	-.2261*	-.1960
Design	-.0914	-.2727**	-.1767
Retention of Paragraphs	-.1486	-.3372**	-.2440*
Retention of Pairs	-.1201	-.2658*	-.1494
Supermarket Test			
Recall Location	-.1131	-.1934	-.0996
Recall	-.0145	-.1429	-.0620
Delayed Recall	-.1963	-.3150	-.1481

Note. N = 117. PPM = Pearson Product-Moment. EMAS-S = Endler Multidimensional Anxiety Scale-State. A-E = Autonomic-Emotional. C-W = Cognitive-Worry. GDS = Geriatric Depression Scale.

* = $p \leq .01$ ** = $p \leq .001$

Table 21

PPM Correlations for Memory Performance and Memory Perception Measures at Pretest for All Subjects

Memory Perception	Memory Performance								
	Guild Memory Scale						Supermarket Test		
MIA	Recall	Paired Associates	Digits	Designs	Retention of Paragraphs	Retention of Pairs	Recall Location	Recall	Delayed Recall
Change	-.0899	-.0778	-.0977	-.0823	-.2009	-.1721	.0108	-.1173	-.2302*
Anxiety	.2892**	.1299	.2180	.2687*	.3311**	.1762	.1279	.0438	.2465*
Locus	-.0893	-.1227	-.0600	.0613	-.0719	-.0929	.0357	-.0847	.0518
MCI									
General	.1258	.1176	.1292	-.0452	.1187	.1435	-.0427	.1849	.1833
Personal	.1551	.1665	.2019	.0508	.1599	.1639	.0115	.2295*	.2244*
Strategy	.1565	.1238	.2043	-.3063	.0967	.1629	.0832	.2063	.2003
Effort	.1949	.1398	.1954	-.0468	.1540	.1292	.1203	.1419	.0775
Independence	.0198	.0974	.1339	-.0545	.1120	.0927	.0248	.0545	.1056
Specific	-.0466	.0609	.1686	.0848	-.1648	.0466	.1132	.0493	.0615
Alzheimer's	.0277	.0072	.0832	.0444	.0287	-.0432	.1497	.0188	.1205
Goal									
Performance	.1420	-.0183	-.0154	-.0661	-.1426	-.0995	.1113	.0380	-.1929
Learning	.0668	-.0185	-.0162	.0150	-.1304	-.1025	-.0073	.1907	-.0459

Note. N = 117. PPM Correlations = Pearson Product-Moment Correlations. MIA = Metamemory In Adulthood. MCI = Memory Controllability Inventory. * = p <.01.

high levels of anxiety, a positive correlation between memory performance and memory perception scores suggest that subjects with high levels of anxiety about memory functioning scored lower on memory tasks than those with low anxiety scores.

2. Significant correlations were found between Delayed Recall of the Supermarket Test and three Memory Perception Measures (i.e., Change and Anxiety subscales of the MIA, and Personal subscale of the MCI). A low score on the Delayed Recall subtest was associated with the perception that memory declines as one ages; that there is little one can do to stop the decline; and anxiety provoking thoughts about one's memory.

3. Positive correlations were found between the Personal subscale of the MCI and two measures of memory performance: Recall and Delayed Recall subtests of the Supermarket Test. Low scores on the memory performance tasks were associated with the belief that there is little one can do to ameliorate memory decline. There were no significant correlations between the memory perception measures and the following memory performance subtests: Paired Associates, Digits, Retention of Pairs, and Recall Location.

Significant correlations were found between **affective symptomatology measures** and **memory perception measures** (see Table 22):

1a) Significant correlations were found between the Autonomic-Emotional (A-E) subscale of the EMAS-S and all three subscales of the MIA: Change, Anxiety, and Locus. A high score on the A-E subscale was associated with the perceptions that memory abilities are subject to

Table 22

PPM Correlations for Affective and Memory Perception Measures at Pretest for All Subjects

	Affect		
	EMAS-S		GDS
	A-E	C-W	
Memory Perception			
MIA			
Change	.3764**	.4376**	.3964**
Anxiety	-.4303**	-.5850**	-.4774**
Locus	.2205*	.1194	.1015
MCI			
General	-.2742**	-.1615	-.1720
Personal	-.3368**	-.1981	-.2474*
Strategy	-.2787**	-.1905	-.0979
Effort	-.2016	-.0591	-.1979
Independence	-.3177**	-.2800**	-.3003**
Specific	-.1465	-.0762	-.0920
Alzheimer's	-.1176	-.1151	-.2644*
Goal Scale			
Performance	.2471*	.4194**	.1871
Learning	.1068	.2725**	.1994

Note. N = 117. PPM = Pearson Product-Moment. EMAS-S = Endler Multidimensional Anxiety Scale-State. A-E = Autonomic-Emotional. C-W = Cognitive-Worry. GDS = Geriatric Depression Scale. MIA = Metamemory In Adulthood. MCI = Memory Controllability Inventory.

* = $p \leq .01$ ** = $p \leq .001$

long-term decline; feelings of stress related to memory performance; and less perceived control over remembering abilities.

b) Significant negative correlations were found between the A-E subscale of the EMAS-S and four subscales of the MCI: General, Personal, Strategy, and Independence. A high score on the A-E subscale was associated with subjects' perceptions that memory controllability decreases with age for oneself and others; lack in belief that memory can be maintained through strategies; and the perception of increased dependence on others for remembering.

c) A significant correlation was found between the A-E subscale of the EMAS-S and the Performance-oriented subscale of the Goal Scale. The overall indication is that those subjects who scored high on the A-E subscale also scored high on the perception that memory capabilities are a shrinking entity which automatically deteriorates with age.

2a) Significant correlations were found between the Cognitive-Worry (C-W) subscale of the EMAS-S and two MIA subscales: Change and Anxiety. A high score on the C-W subscale was associated with the perception that memory abilities are subject to long-term decline and feelings of stress related to memory performance.

b) A positive correlation was found between the C-W subscale and the Independence subscale of the MCI. Those subjects scoring high on cognitive worry also scored high on dependence on others to help them to remember.

3a) A significant correlation was found between the GDS and two subscales of the MIA: Change and Anxiety. Those subjects scoring high

on the depression scale were associated with the perception that memory abilities decline as one ages; and increased feelings of stress related to memory performance.

b) A negative correlation was found between the GDS and three subscales of the MCI: Personal, Independence, and Alzheimer's. Increased depressive symptomatology was associated with the belief that memory controllability decreases with age necessitating increased dependence on others for memory abilities; and belief of the inevitability of Alzheimer's disease.

Lastly, three preliminary 2 (Treatment: CRG, TMG) X 2 (Sex: Male, Female) X 3 (Pretest, Posttest, Follow up) X 4 (Waves: I, II, III, IV) repeated measures multivariate analyses of variance (MANOVA) were performed to determine any significant differences between males and females, and any significant differences between Waves I, II, III, and IV on measures of memory performance, memory perception, and affective symptomatology. Since there were no significant interactions between males and females on any measures the sex variable was eliminated. There was a significant difference between Waves I, II, III, and IV, however, this was due to only three of the twenty-four variables (i.e., Geriatric Depression Scale, Digits subtest of the Guild Memory Scale, and Strategy subtest of the Memory Controllability Inventory).

Major Analyses

Three 2 X 3 (Treatment X Time) repeated measures MANOVAs were performed to measure changes in memory performance, memory perception, and affective symptomatology over time (i.e., from pretest to posttest

to follow up) and difference due to two types of memory training (i.e., CRG and TMG). When significant values ($p \leq .01$) were found in the MANOVA, univariate analyses of variance were performed to determine the significance of each variable. Scheffé tests (Ferguson, 1971) were then employed on each of the univariates to identify all significant comparisons between pairs of mean scores across Time and between Treatment Groups.

Memory Performance

Hypotheses 1, 2, and 3.

Hypotheses 1, 2, and 3 predicted that (a) overall the CRG subjects would score significantly higher on memory performance measures than the TMG subjects; (b) the CRG subjects would score significantly higher on memory performance measures at posttest than at pretest, and that the CRG subjects would score significantly higher than the TMG subjects on memory performance measures at posttest; and (c) the CRG subjects would sustain memory performance gains at follow up, and that the CRG subjects would score significantly higher than the TMG subjects on memory performance measures at follow up. A 2 X 3 repeated measures MANOVA was conducted to determine significant differences in measures of memory performance due to treatment and between time periods. A significant interaction effect was evident between the two groups (i.e., CRG subjects and TMG subjects) and the memory performance measures over time ($F(18, 300) = 6.59$, $p \leq .001$).

Univariate analyses indicated all memory performance variables to have significant effects (see Table 23), except the Retention of

Table 23

Univariate Analyses of Memory Performance Variables

Variables	df	F	p
Guild Memory Scale			
Recall	2,158	5.80	.004
Paired Associates	2,158	8.51	.001
Digits	2,158	7.87	.001
Designs	2,158	4.81	.01
Retention of Paragraphs	2,158	4.03	.02
Retention of Pairs	2,158	10.48	.001
Supermarket Test			
Location Recall	2,158	8.85	.001
Recall	2,158	11.29	.001
Delayed Recall	2,158	22.31	.001

Note. N = 117.

Paragraphs subtest of the Guild Memory Scale. Scheffé tests were conducted on each of the significant univariates to identify all significant comparisons between pairs of mean scores across Time and between Treatment Groups (see Figures 1 - 8).

The CRG subjects scored significantly higher at posttest than at pretest on the Guild Memory Scale (excluding the Retention of Paragraphs subtest) and two subtests of the Supermarket Test: Location Recall and Delayed Recall. Only the Recall subtest of the Supermarket Test revealed no significant increase in memory performance. The CRG subjects did not score significantly higher than the TMG subjects at posttest on memory performance measures.

The CRG subjects revealed no significant change in memory performance abilities between posttest and follow up, indicating maintenance of improvements in memory abilities over a 9 week period. However, the CRG subjects scored significantly higher than the TMG subjects at follow up on memory performance measures on the Guild Memory Test (excluding the Retention of Paragraphs subtest) and the Recall subtest of the Supermarket Test.

Hypothesis 1 predicted that overall the CRG subjects would score significantly higher on memory performance measures than the TMG subjects. Results of the univariate analyses and Scheffé tests support this hypothesis only at follow up.

Hypothesis 2 predicted that the CRG subjects would score significantly higher at posttest than at pretest on memory performance measures after 10 weeks of cognitive restructuring memory training.

Figure 1

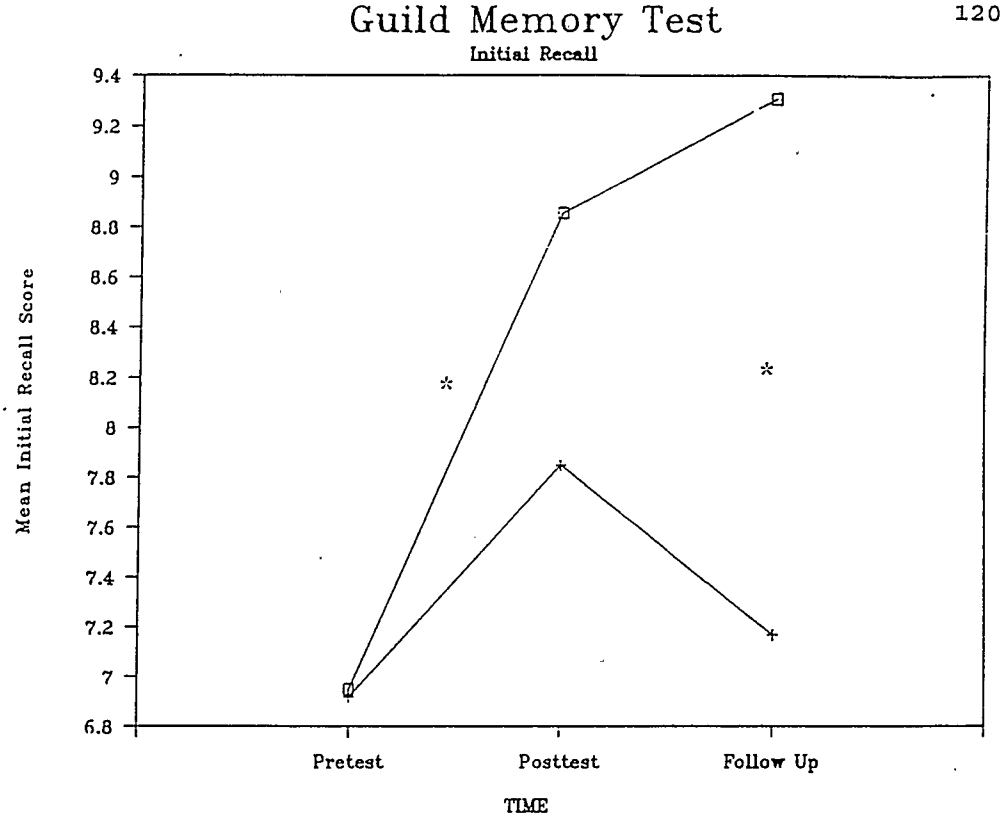


Figure 2

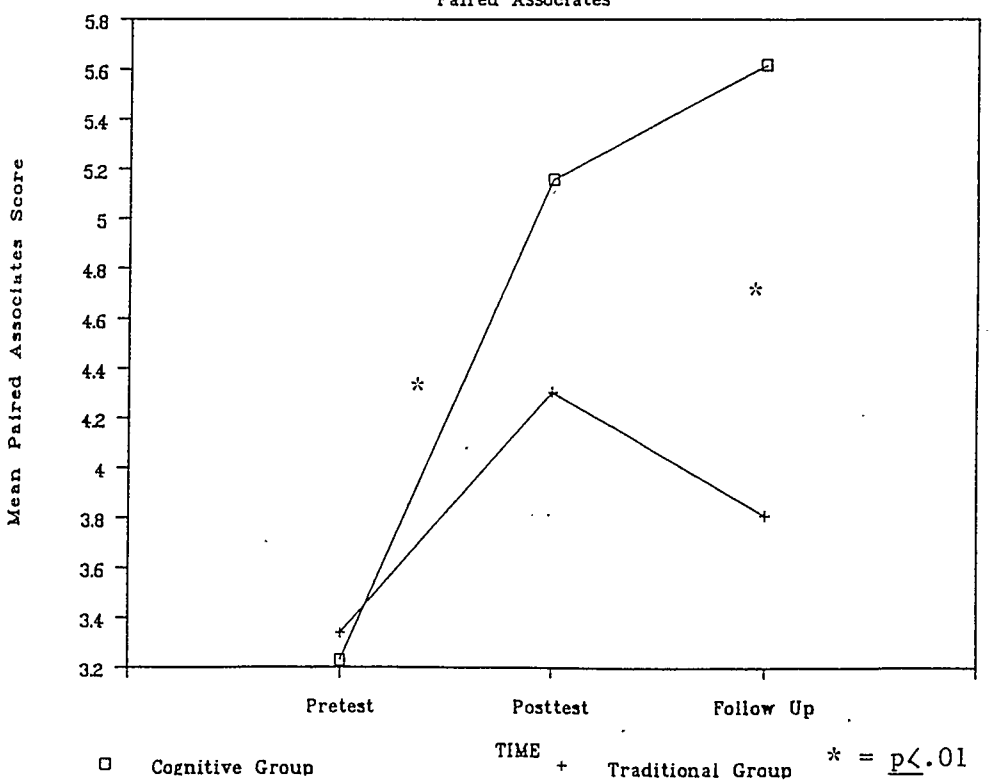


Figure 3

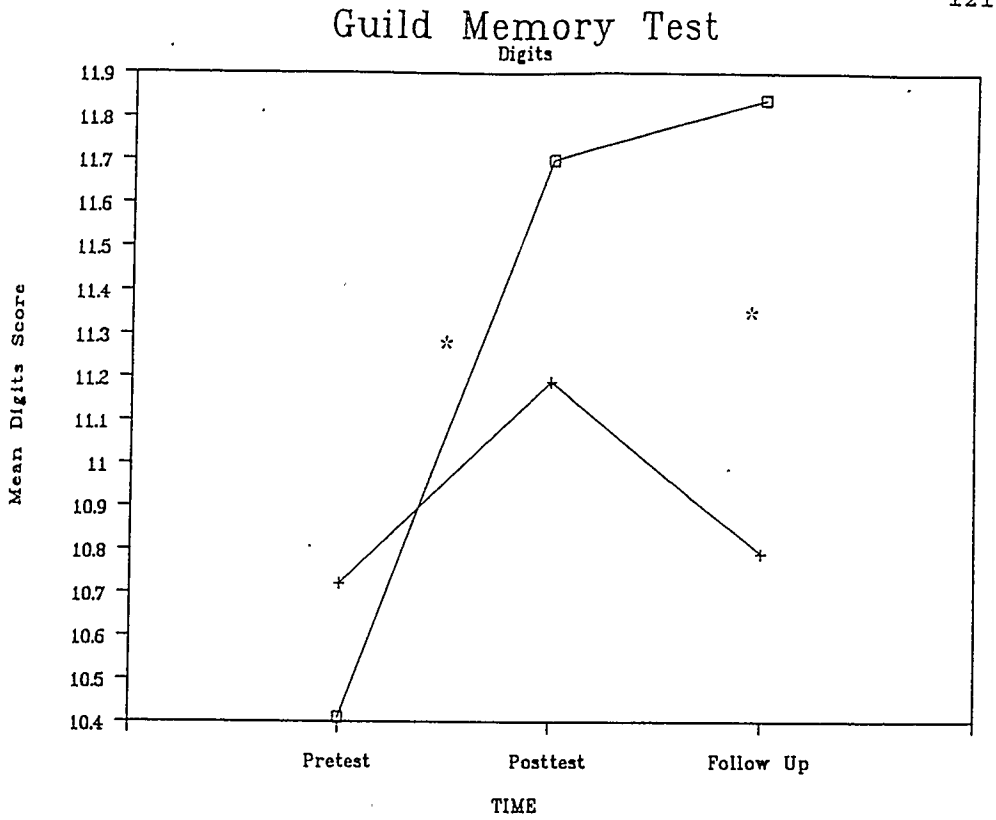


Figure 4

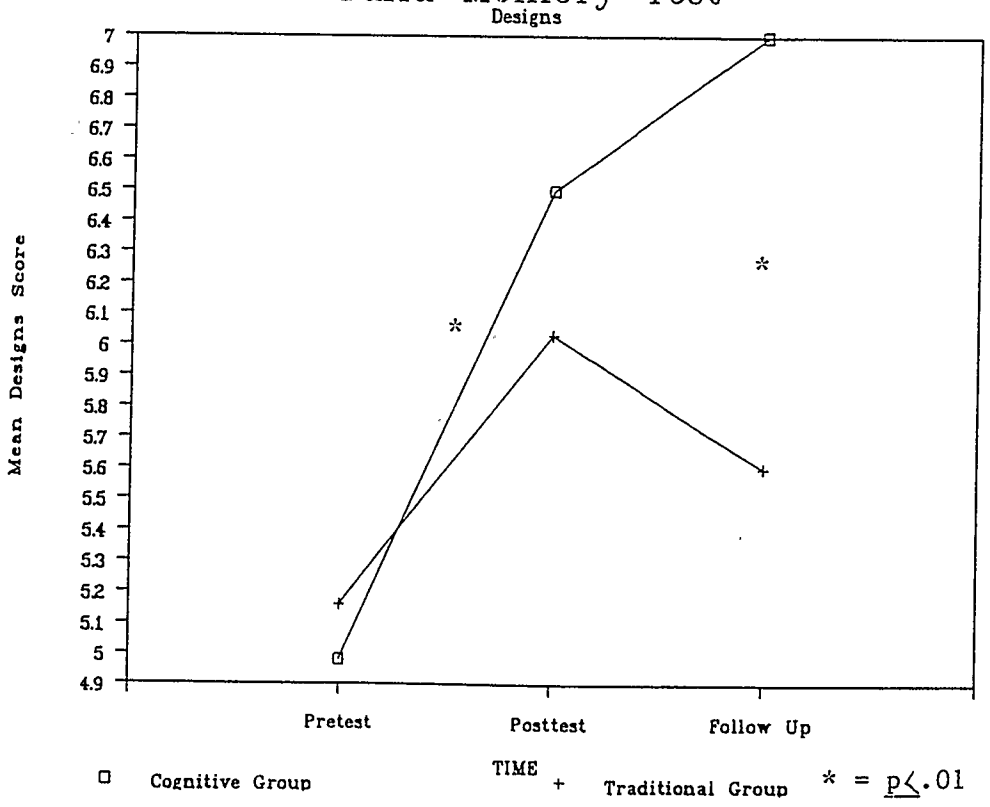


Figure 5

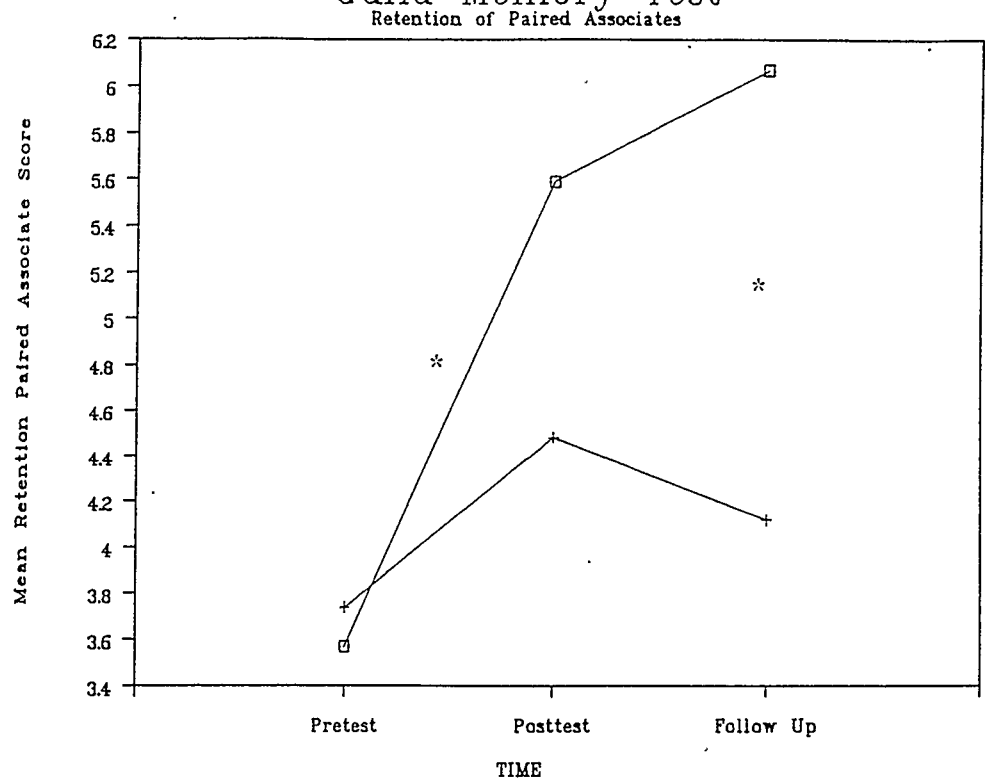


Figure 6

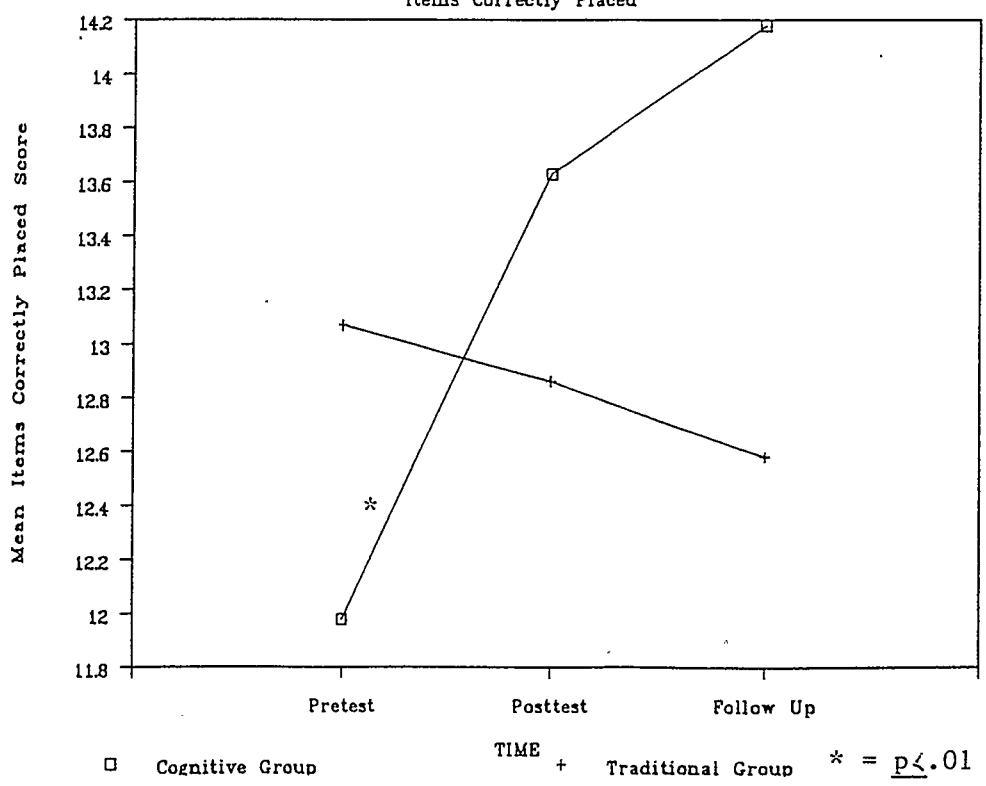


Figure 7

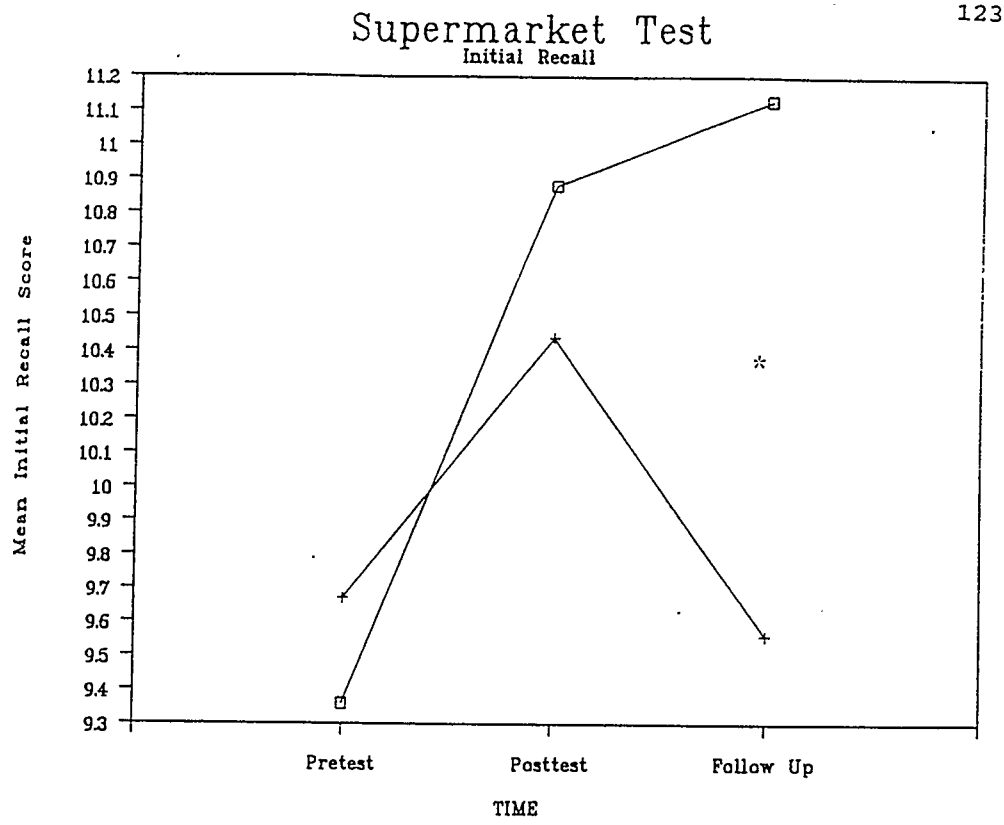
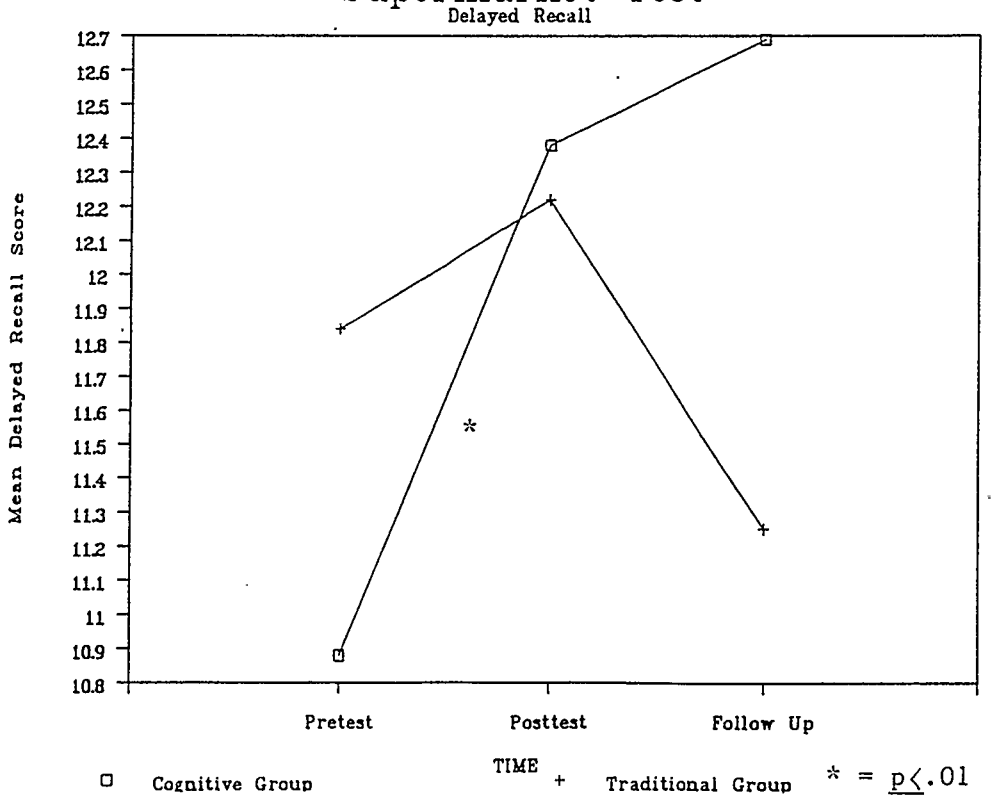


Figure 8



Results of the univariate analyses and Scheffé tests support this hypothesis on seven of the nine measures of memory performance. Hypothesis 2 also predicted that the CRG subjects would score significantly higher than the TMG subjects on memory performance measures at posttest. There was no statistical support for this prediction at posttest.

Hypothesis 3 predicted that the CRG subjects would sustain memory performance gains at follow up conducted 9 weeks after posttest. The univariate analyses and Scheffé tests support this hypothesis on all memory performance measures. Hypothesis 3 also predicted that the CRG subjects would score significantly higher than the TMG subjects on memory performance measures at follow up. Results of the univariate analyses and Scheffé tests support this hypothesis on six of the nine memory performance measures.

Anxiety and Depressive Symptomatology

Hypotheses 4, 5, and 6.

Hypotheses 4, 5, and 6 predicted that (a) overall the CRG subjects would score significantly lower on anxiety and depressive symptomatology measures than the TMG subjects; (b) the CRG subjects would score significantly lower on anxiety and depressive symptomatology measures at posttest than at pretest, and that the CRG subjects would score significantly lower than the TMG subjects on the affective measures at posttest; and (c) the CRG subjects would sustain posttest levels of anxiety and depressive symptomatology at follow up (conducted 9 weeks after posttest), and that the CRG subjects would score significantly

lower than the TMG subjects on the affective measures at follow up. A 2 X 3 repeated measures MANOVA was conducted to determine significant differences in measures of affect (i.e., anxiety and depressive symptomatology) due to treatment and between time periods. An interaction effect was evident between the CRG and the TMG subjects and affective measures of anxiety and depressive symptomatology over time ($F(6, 304) = 15.31$, $p \leq .001$).

Univariate analyses of variance indicate all affective variables to have significant effects (see Table 24). Scheffé tests were conducted on each of the univariates to identify all significant comparisons between pairs of mean scores across Time and between Treatment Groups (see Figures 9 - 11).

The CRG subjects scored significantly lower than the TMG subjects at posttest on the A-E component of state anxiety. The CRG subjects scored significantly lower than the TMG subjects at posttest on the C-W component of state anxiety. Also, the CRG subjects scored significantly lower than the TMG subjects at posttest on the Geriatric Depression Scale (GDS). Further, there were no significant changes in measures of anxiety or depressive symptomatology for either group at follow up, indicating stability of changes between the 9 week period of posttest and follow up.

The CRG subjects revealed no significant change in affective symptomatology at posttest and follow up. There were no significant differences between the CRG subjects and the TMG subjects on affective measures at follow up.

Table 24

Univariate Analyses of Affective Variables

Variables	df	F	p
EMAS-S			
A-E	2,154	9.02	.001
C-W	2,154	16.52	.001
GDS	2,154	36.16	.001

Note. N = 117. EMAS-S = Endler Multidimensional Anxiety Scale-State. A-E = Autonomic-Emotional. C-W = Cognitive Worry. GDS = Geriatric Depression Scale.

Figure 9

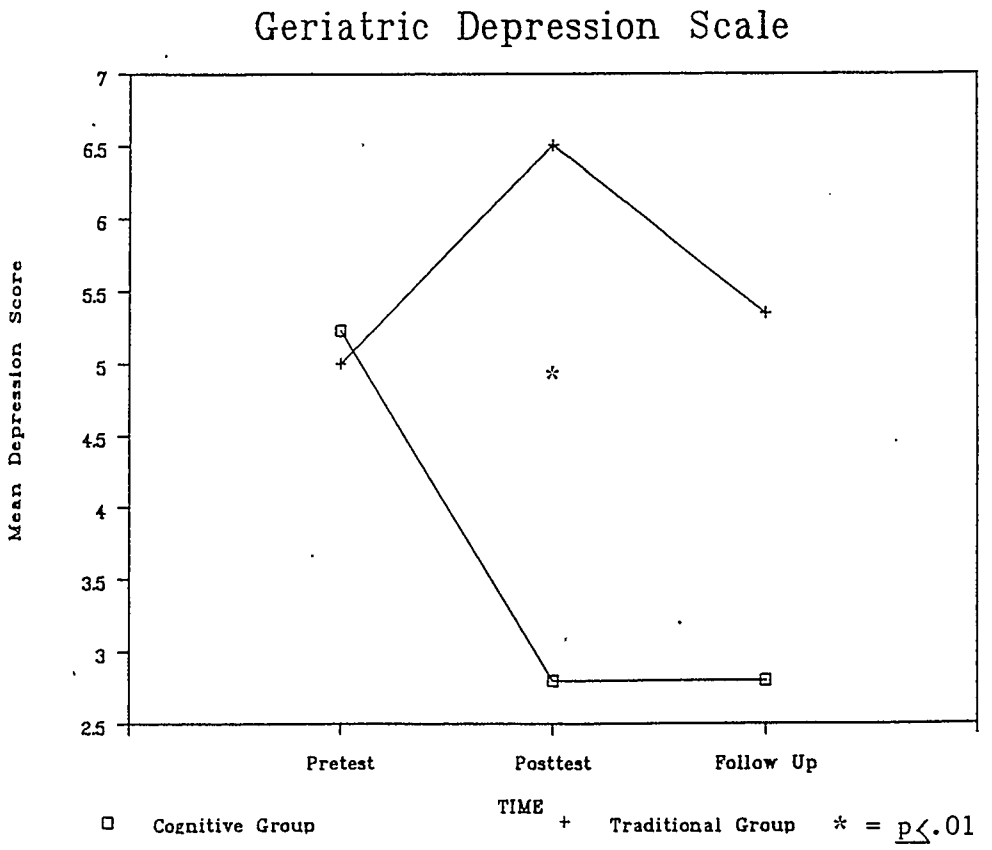


Figure 10

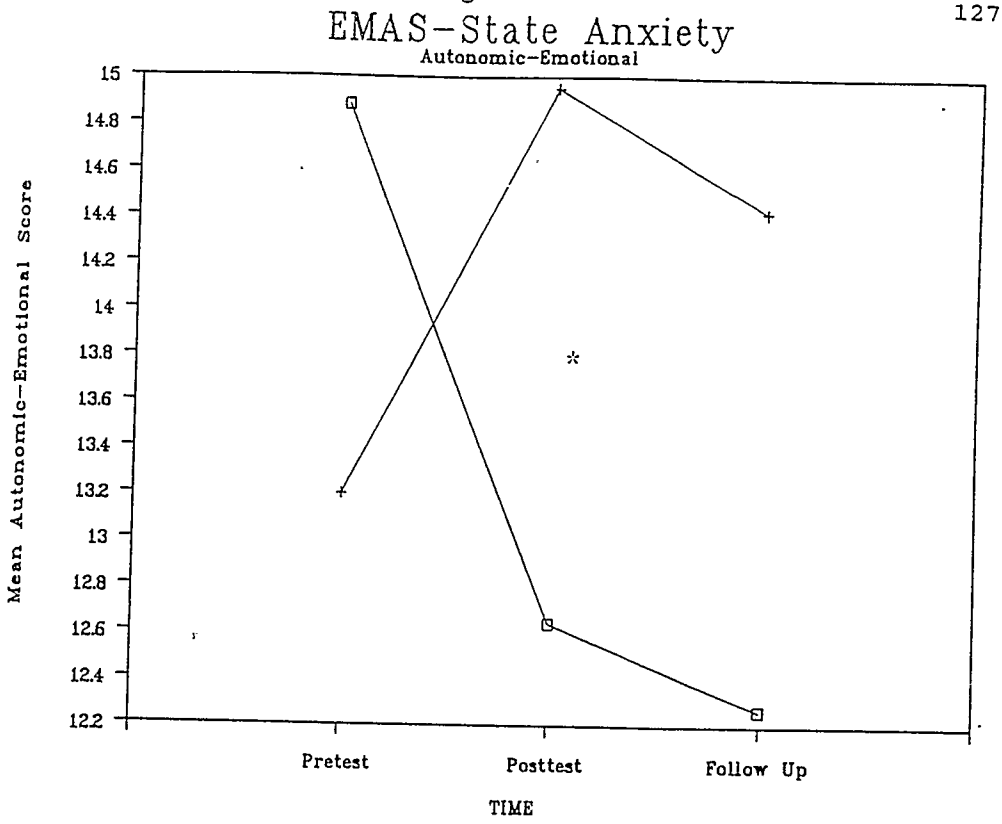
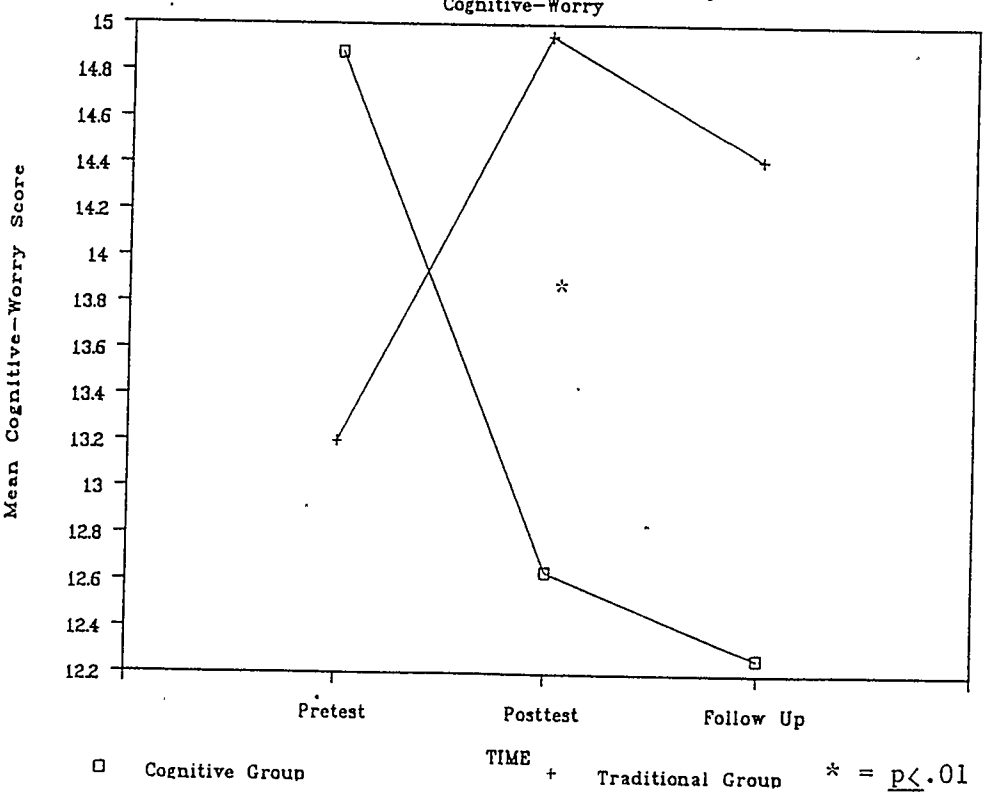


Figure 11



Hypothesis 4 predicted that overall the CRG subjects would score significantly lower on anxiety and depressive symptomatology measures than the TMG subjects. Results of the univariate analyses and Scheffé tests support this hypothesis only at posttest.

Hypothesis 5 predicted that the CRG subjects would score significantly lower on anxiety and depressive symptomatology measures at posttest than at pretest. There was no statistical support for this prediction at posttest. Hypothesis 5 also predicted that the CRG subjects would score significantly lower than the TMG subjects on the affective measures at posttest. Results of the univariate analyses and Scheffé tests support this hypothesis on all measures.

Hypothesis 6 predicted that the CRG subjects would sustain posttest levels of anxiety and depressive symptomatology at follow up (conducted 9 weeks after posttest). Results of the univariate analyses and Scheffé tests support this hypothesis on all measures. Hypothesis 6 also predicted that the CRG subjects would score significantly lower than the TMG subjects on the affective measures at follow up. There was no statistical support for this prediction.

Memory Perception

Hypotheses 7, 8, and 9

Hypotheses 7, 8, and 9 predicted that (a) overall the CRG subjects would score significantly higher on beneficial memory perception measures than the TMG subjects; (b) the CRG subjects would score higher on beneficial memory perception measures at posttest than at pretest, and that the CRG subjects would score significantly higher than the TMG

subjects on beneficial memory perception measures at posttest; and (c) the CRG subjects would sustain gains in beneficial memory perception measures at follow up, and that the CRG subjects would score significantly higher than the TMG subjects on beneficial memory perception measures at follow up. A 2 X 3 repeated measures MANOVA was conducted to determine significant differences in measures of memory perceptions due to treatment and between time periods. An interaction effect was evident between the CRG and TMG subjects and memory perception measures over time ($\underline{F}(24, 286) = 19.60$, $\underline{p} \leq .001$).

Univariate analyses of variance indicate all memory perception measures to have significant effects (see Table 25). Scheffé tests were conducted on each of the univariates to identify all significant comparisons between pairs of mean scores across Time and between Treatment Groups (see Figures 12 - 23).

The CRG subjects scored significantly lower at posttest on the Change and Locus subscales of the MIA than at pretest. Low scores on the Change and Locus subscales suggest the perception of memory abilities as generally stable, with more perceived personal control over remembering. There was no significant difference from pretest to posttest on the Anxiety subscale of the MIA. However, the CRG subjects scored significantly higher than the TMG subjects at pretest on measures of stress related to memory, thereby potentially obscuring significant differences at posttest. There were no significant changes on the Change and Locus subscales for the CRG subjects at follow up, indicating stability of changes after treatment for a 9 week period.

Table 25

Univariate Analyses of Memory Perception Variables

Variables	df	F	p
MIA			
Change	2,154	60.88	.001
Anxiety	2,154	18.21	.001
Locus	2,154	36.05	.001
MCI			
General	2,154	38.23	.001
Personal	2,154	38.13	.001
Strategy	2,154	29.54	.001
Effort	2,154	19.66	.001
Independence	2,154	56.26	.001
Specific	2,154	14.70	.001
Alzheimer's	2,154	11.95	.001
Goal Scale			
Performance-oriented	2,154	21.17	.001
Learning-oriented	2,154	13.12	.001

Note. N = 117. MIA = Metamemory in Adulthood. MCI = Memory Controllability Inventory.

Figure 12

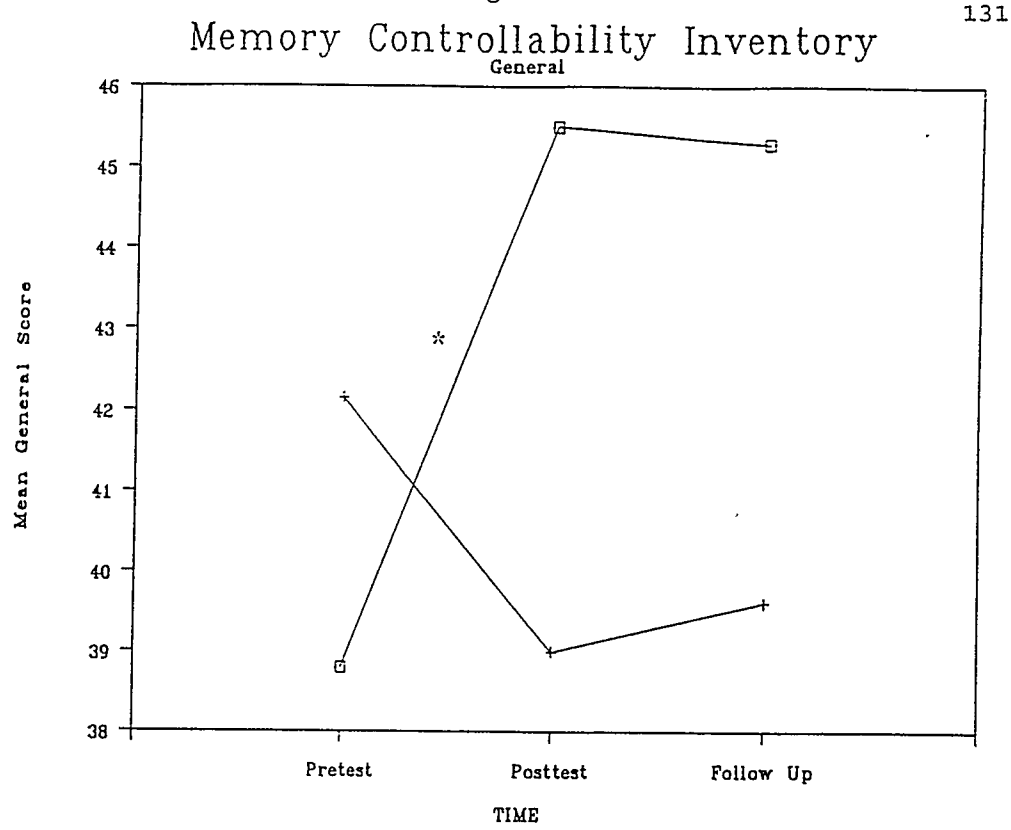


Figure 13

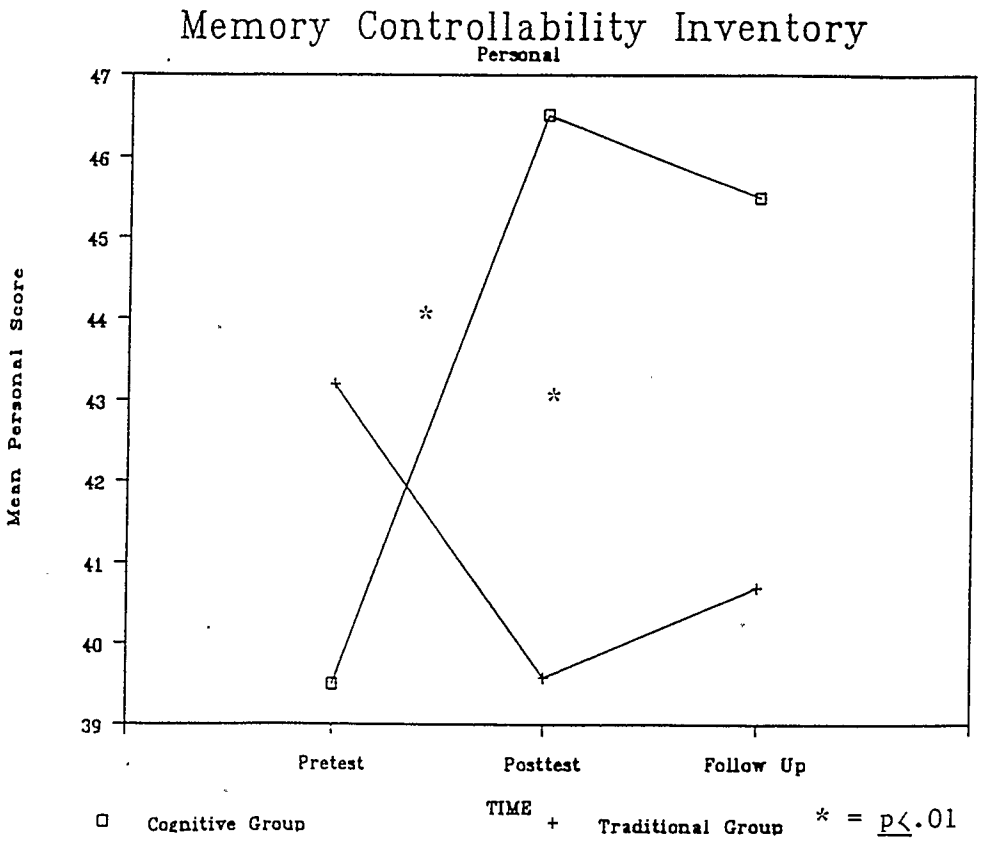


Figure 14

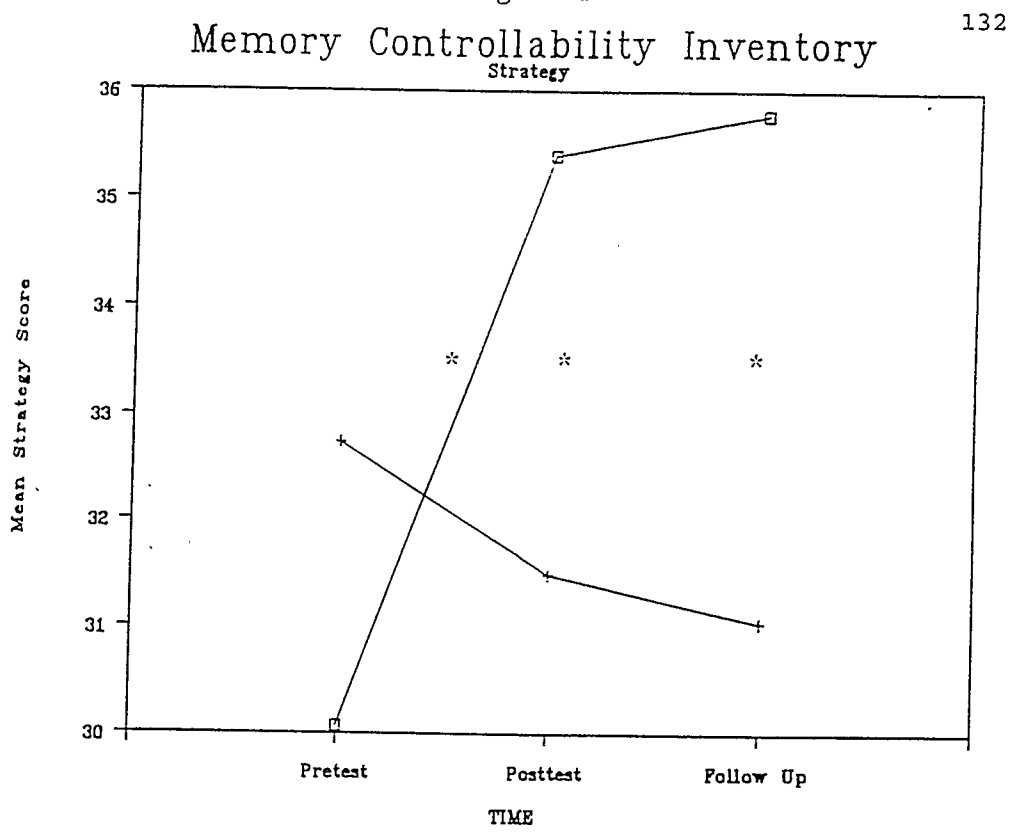


Figure 15

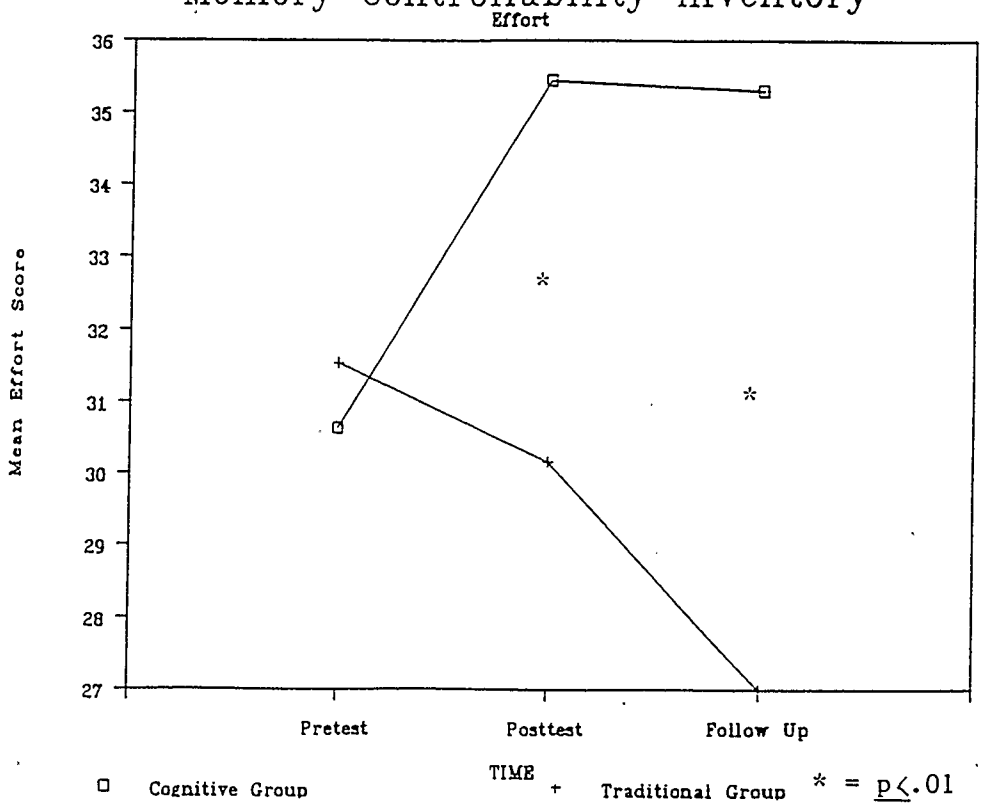


Figure 16

Memory Controllability Inventory

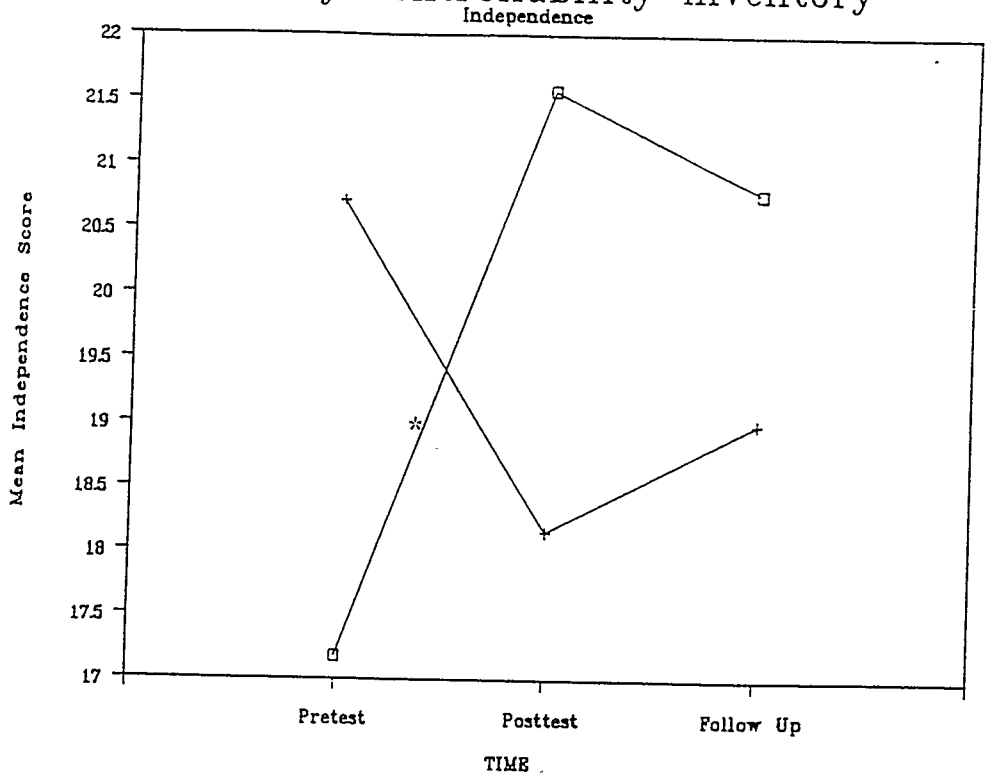


Figure 17

Memory Controllability Inventory

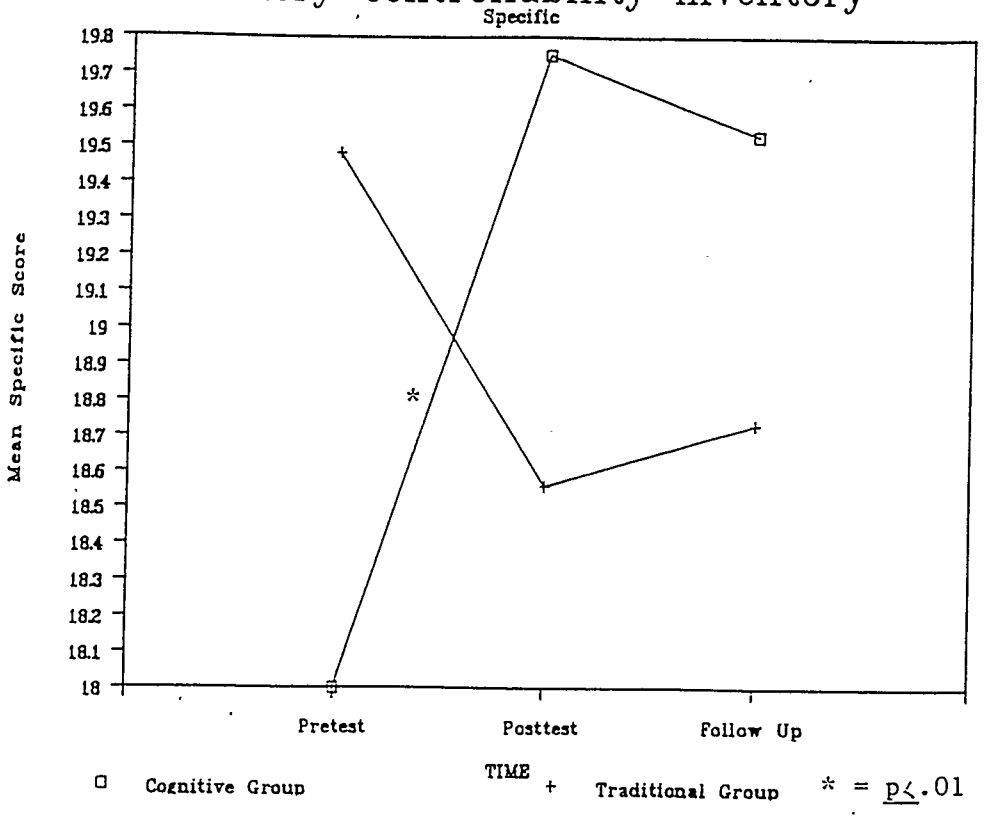


Figure 18

Memory Controllability Inventory

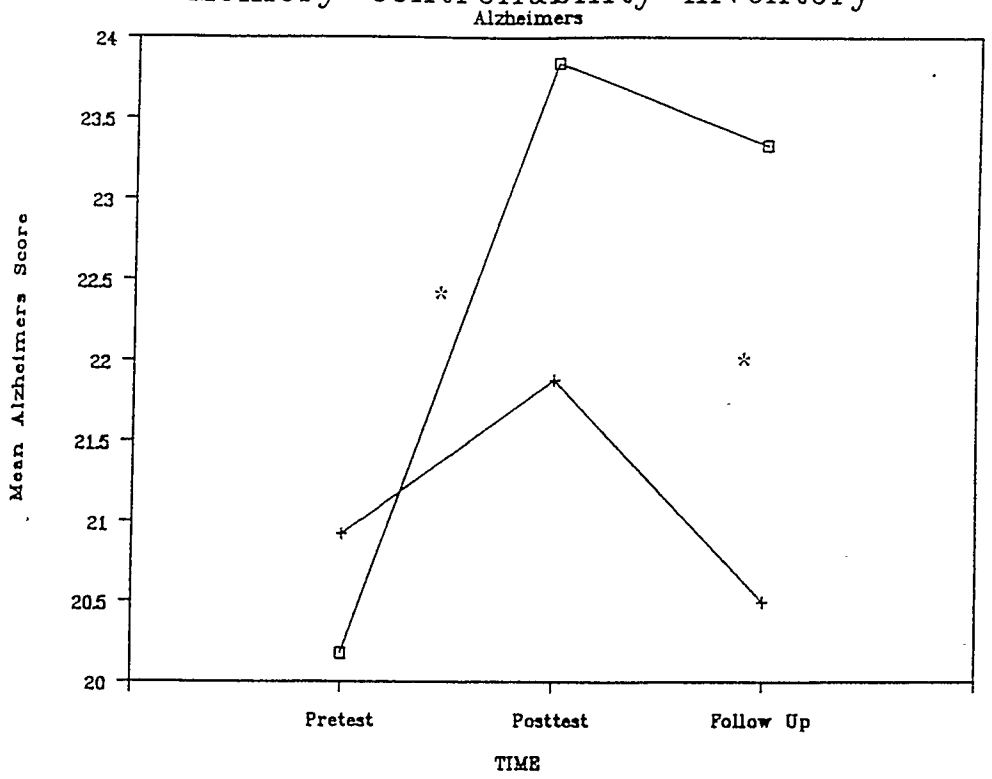


Figure 19

Metamemory in Adulthood

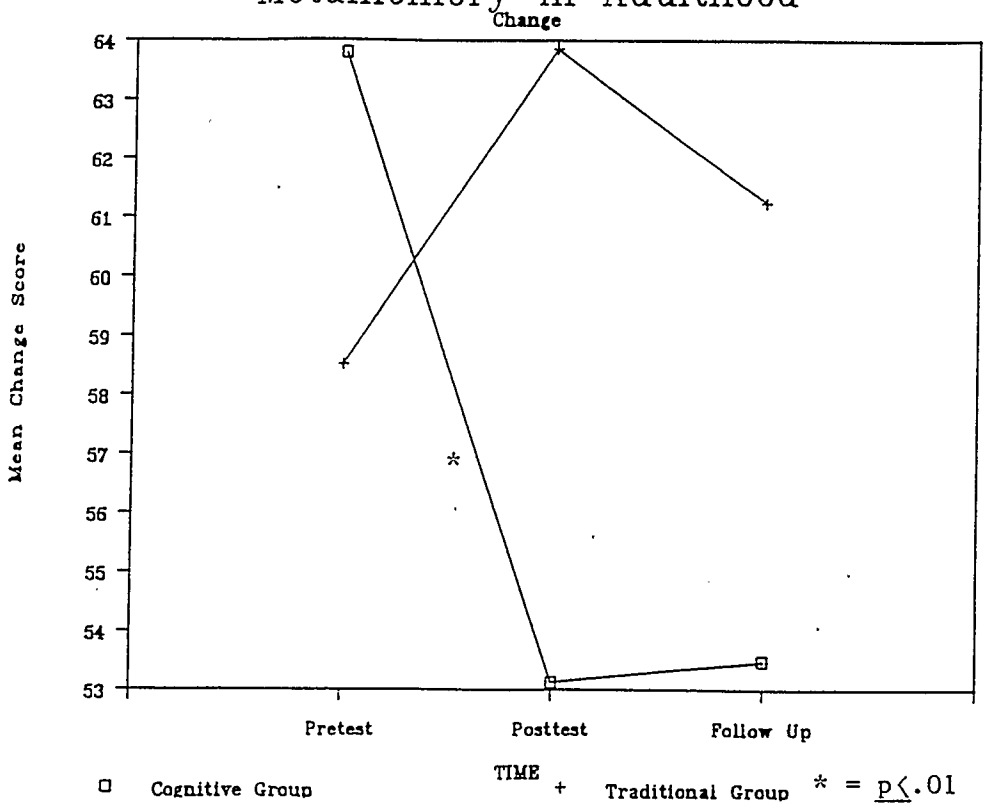


Figure 20

Metamemory in Adulthood

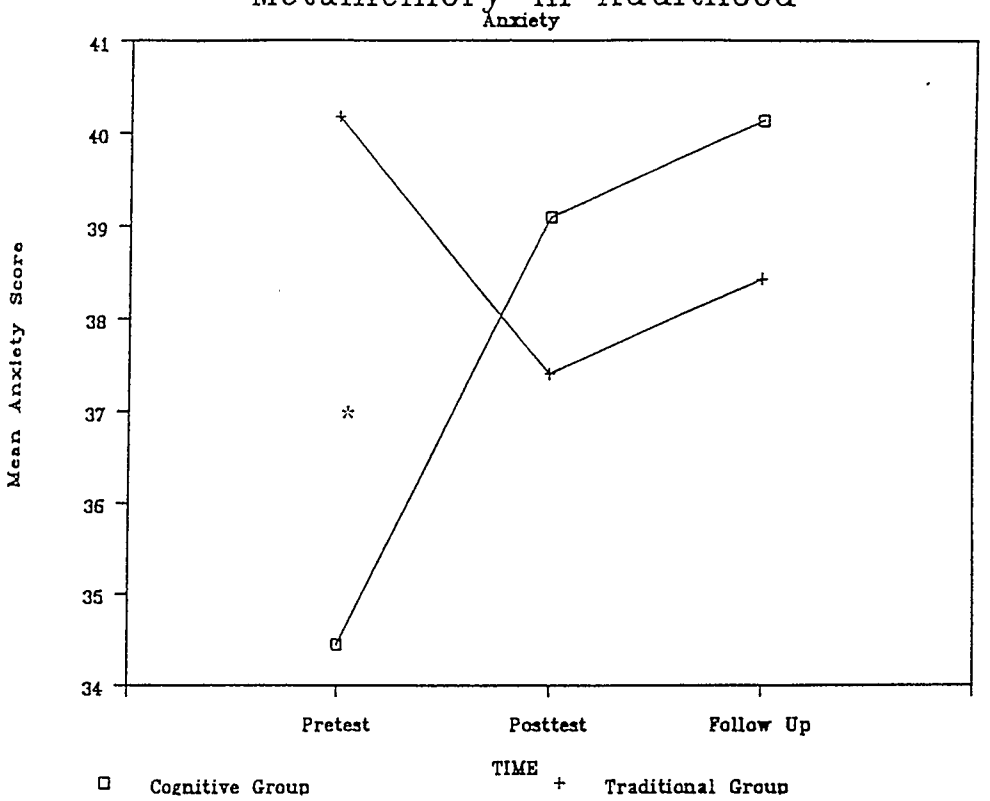


Figure 21

Metamemory in Adulthood

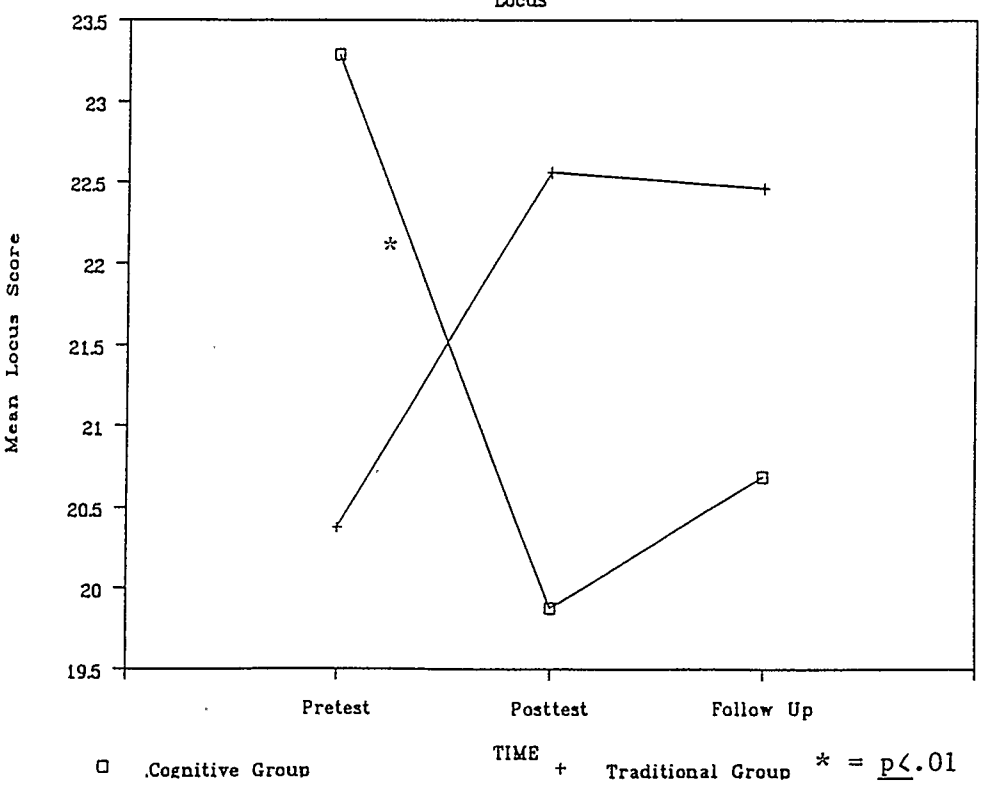


Figure 22

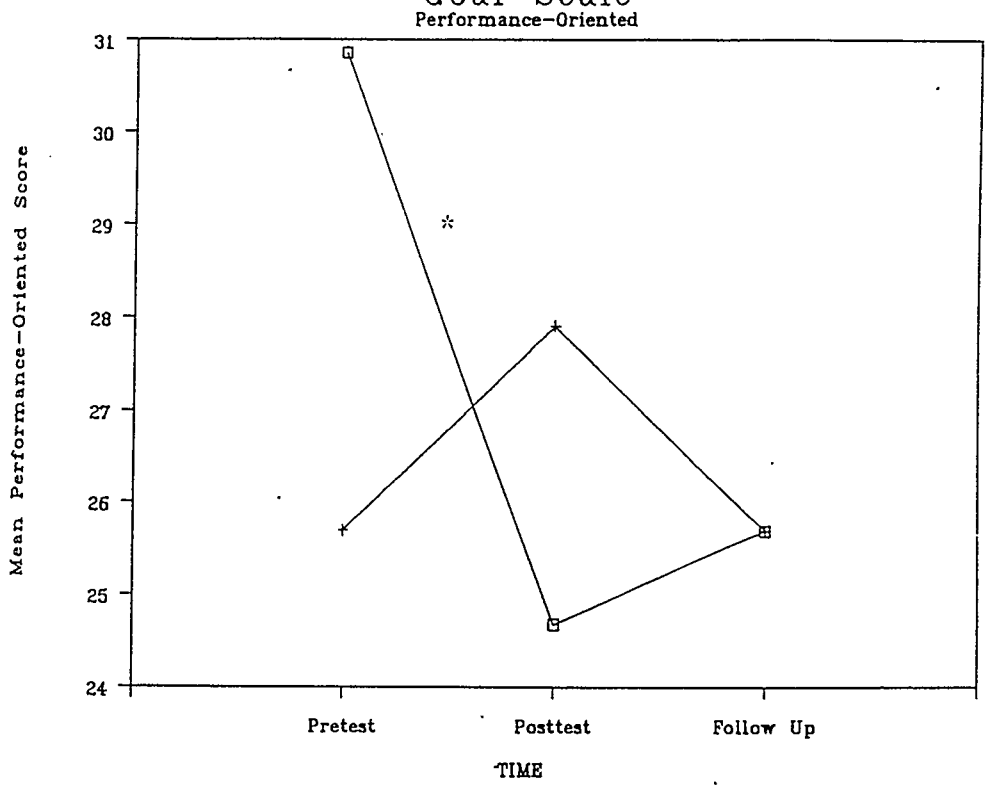
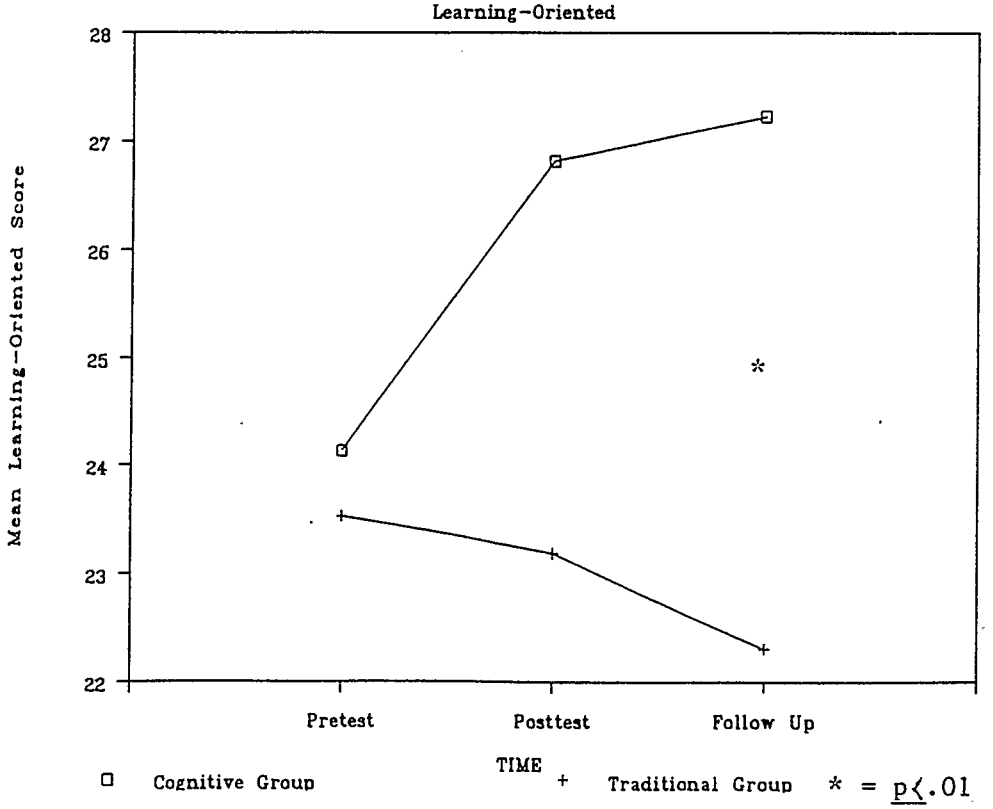


Figure 23



The CRG subjects scored significantly higher at posttest than at pretest on six of the seven subtests of the MCI. These results imply a belief in greater memory controllability and independence. However, subjects' scores on the Effort subscale of the MCI were not significantly changed from pretest to posttest for the CRG. There was no significant loss of improvements attained on the six subscales of the MCI between the posttest and follow up assessment, indicating stability of change over the 9 week period.

The CRG subjects scored significantly higher than the TMG subjects at posttest on the following subscales of the MCI: Personal, Strategy, and Effort. The CRG subjects held a greater belief in personal memory controllability, and a greater belief in the benefits of applying strategies and effort to memory encounters than the TMG subjects. This perspective was maintained at follow up for the Strategy and Effort subscales. Further, the CRG subjects scored significantly higher than the TMG subjects on the Alzheimer's subscale of the MCI at follow up, suggesting that these subjects did not believe in the inevitability of Alzheimer's disease with age.

The CRG subjects scored lower at posttest than at pretest on the Performance-oriented subscale of the Goal Scale. Those with a performance-orientation see memory capability as an entity that automatically deteriorates with age and little that can stop the decline. Further, there was no significant change on the Performance-oriented subscale between the posttest and follow up assessments, indicating stability of change over the 9 week period after treatment.

The CRG subjects scored significantly higher than the TMG subjects on the Learning-oriented subscale at follow up. Those with a learning-orientation tend to see memory as multifaceted, and as possible of improving through effort.

Hypothesis 7 predicted that overall the CRG subjects would score significantly higher on measures of beneficial memory perception measures than the TMG subjects. As indicated above, results of the univariate analyses and Scheffé tests support this hypothesis on three of the twelve subtests at posttest, and four of the twelve subtests at follow up.

Hypothesis 8 predicted that the CRG subjects would score significantly higher on beneficial memory perception measures at posttest than at pretest. Results of the univariate analyses and Scheffé tests support this hypothesis on nine of the twelve subtests. Hypothesis 8 also predicted that the CRG subjects would score significantly higher than the TMG subjects on beneficial memory perception measures at posttest. Results of the univariate analyses and Scheffé tests support this hypothesis on three of the twelve subtests.

Hypothesis 9 predicted that the CRG subjects would sustain gains in beneficial memory perception at follow up (conducted 9 weeks after posttest). Results of the univariate analyses and Scheffé tests support this hypothesis. Hypothesis 9 also predicted that the CRG subjects would score significantly higher than the TMG subjects on beneficial

memory perception measures at follow up. Results of the univariate analyses and Scheffé tests support this hypothesis on four of the twelve subtests.

Secondary Analyses: An Examination of Correlations Among Measures for CRG Subjects and TMG Subjects at Posttest and Follow Up

CRG Subjects' Correlations at Posttest

No specific hypotheses were determined for the CRG subjects at posttest, however, Pearson Product-Moment (PPM) correlations were analyzed further to seek clarification of the overall statistical results.

Affective symptomatology and memory performance.

PPM correlations were examined to seek further clarification of the relationship between affective measures and memory performance measures for the CRG subjects at posttest (see Table 26). Significant negative correlations were found between C-W and two subscales of the Guild Memory Scale: Paired Associates and Retention of Pairs, suggesting that an increase in memory performance on these two measures was associated with decreased cognitive worry.

Memory performance and memory perception.

PPM correlations were used to examine the relationship between memory performance and memory perception for CRG subjects at posttest (see Table 27).

1) Significant correlations were found between the Anxiety subscale of the MIA and two subtests of the Guild Memory Scale: Recall

Table 26

PPM Correlations for Affective and Memory Performance Measures at Posttest for the CRG

	Affect		
	EMAS-S		GDS
	A-E	C-W	
Memory Performance			
Guild Memory Scale			
Recall	-.1636	-.2276	-.2464
Paired Associates	-.1628	-.3944**	-.1525
Digits	-.0667	-.0512	-.1471
Design	-.0607	-.1265	-.0588
Retention of Paragraphs	-.1212	-.2559	-.2954
Retention of Pairs	-.1665	-.4016**	-.1699
Supermarket Test			
Location Recall	-.2557	-.2252	-.0721
Recall	-.1022	-.1415	-.2238
Delayed Recall	-.1218	-.1545	-.1096

Note. n = 56. PPM = Pearson Product-Moment. CRG = Cognitive Research Group. EMAS-S = Endler Multidimensional Anxiety Scale-State. A-E = Autonomic-Emotional. C-W = Cognitive-Worry. GDS = Geriatric Depression Scale.

** = $p \leq .001$

Table 27

PPM Correlation for Memory Performance and Memory Perception Measures at Posttest for CRG

Memory Perception	Memory Performance								
	Guild Memory Scale						Supermarket Test		
MIA	Recall	Paired Associates	Digits	Designs	Retention of Paragraphs	Retention of Pairs	Recall Location	Recall	Delayed Recall
Change	-.1210	-.1421	-.0790	-.0757	-.1769	-.1503	-.1892	-.1747	-.1309
Anxiety	.3674*	.2659	.1401	.1254	.4084**	.2970	.2696	.2245	.1633
Locus	.1362	.0513	-.0180	.0441	.0762	.0489	-.1182	-.1060	-.1176
MCI									
General	-.0230	.2303	.1303	-.0371	.0289	.2004	-.0148	.2140	.2057
Personal	.0322	.1599	.0853	.0698	.1027	.1927	.1846	.0810	.2119
Strategy	.0255	.2161	.2298	.0796	.0557	.2215	.0863	.1261	.2493
Effort	.0092	.0703	.0465	.0009	.1024	.1021	.0961	.1740	.1231
Independence	.0623	.2944	.0389	.0737	.0797	.2848	-.0017	.1164	.1017
Specific	.1503	.2756	.2380	.3436*	.1304	.3603*	.1783	-.1304	.1490
Alzheimer's	.0138	.0823	-.1102	-.0842	.1109	.0528	-.0221	.0431	.1351
Goal									
Performance	-.4000**	-.3686*	-.2359	-.0979	-.3501*	-.3176*	-.1962	-.1128	-.1333
Learning	-.1234	.0540	-.0681	.0318	-.1524	-.0291	.1113	-.0185	.1258

Note. N = 56. PPM Correlations = Pearson Product-Moment Correlations. CRG = Cognitive Restructuring Group. MIA = Metamemory In Adulthood. MCI = Memory Controllability Inventory. ** = $p \leq .001$.

and Retention of Paragraphs, suggesting that an increase in memory performance is associated with less stress related to memory function.

2) Positive correlations were found between the Specific subscale of the MCI and two measures of the Guild Memory Scale: Designs and Retention of Paired Associates, suggesting that an increase in the belief that memory losses are specific, and not global, was associated with increased memory performance on these measures.

3) Negative correlations were found between Performance-orientation of the Goal Scale and four memory performance measures: Recall, Paired Associates, Retention of Paragraphs, and Retention of Pairs. The findings suggest that a decrease in the belief that memory capability automatically deteriorates with age and little one can do to deter the decline was associated with an increase in memory performance on the above measures.

Findings on the memory performance and memory perception variables suggest that CRG subjects with increased memory performance reported less stress related to memory function, perceived memory loss as specific instead of global, and held a diminished belief that memory ability automatically deteriorates with age. No significant correlations were evident between the memory performance subscales of the Supermarket Test and memory perception measures.

Memory perception and affective symptomatology.

PPM correlations were examined to seek clarification of the relationship between memory perception and affective symptomatology measures for the CRG subjects at posttest (see Table 28).

Table 28

PPM Correlations for Memory Perception and Affective Measures at Posttest for the CRG

	Affect		
	EMAS-S		GDS
	A-E	C-W	
Memory Perception			
MIA			
Change	.3325*	.3347*	.2696
Anxiety	-.4613**	-.5968**	-.6415**
Locus	.1994	.1000	-.0677
MCI			
General	-.2243	-.0583	-.2584
Personal	-.1895	-.0921	-.1615
Strategy	-.1466	.0771	-.0646
Effort	-.1390	-.1188	-.1405
Independence	-.1287	-.1171	-.2775
Specific	-.1823	-.1703	-.1788
Alzheimer's	-.1817	-.2394	-.0639
Goal Scale			
Performance	.2961	.3297*	.4172**
Learning	.1110	.1727	.3191*

Note. n = 56. PPM = Pearson Product-Moment. CRG = Cognitive Restructuring Memory Training Group. EMAS-S = Endler Multidimensional Anxiety Scale-State. A-E = Autonomic-Emotional. C-W = Cognitive-Worry. GDS = Geriatric Depression Scale. MIA = Metamemory In Adulthood. MCI = Memory Controllability Inventory.

* = $p \leq .01$ ** = $p \leq .001$

1) Positive correlations were found between the Change subscale of the MIA and two measures of state anxiety: A-E and C-W, suggesting that the perception that memory abilities are generally stable as one ages was associated with less autonomic-emotional and cognitive-worry components of state anxiety.

2) Negative correlations were found between the Anxiety subscale of the MIA and three measures of affective symptomatology: A-E and C-W of the EMAS-S, and the GDS. Since a high score on the Anxiety subscale indicates low anxiety, a negative correlation between scores suggest that subjects' feelings of stress related to memory function were associated with less state anxiety and less depressive symptomatology.

3) Positive correlations were found between the Performance-oriented subscale of the Goal Scale and two measures of affective symptomatology: C-W of the EMAS-S and the GDS. Indications of the findings are that lower adherence to the belief that memory capability deteriorates with age was associated with less cognitive worry and fewer signs of depressive symptomatology.

4) A positive correlation was evident between the Learning-oriented subscale of the Goal Scale and the GDS, suggesting that fewer signs of subjects' depressive symptomatology was associated with the belief that memory is multifaceted, and is possible to improve with effort.

There were no significant relationships between memory perception, measured by the MCI subscales, and affective symptomatology measures.

CRG Subjects' Correlations at Follow up

No specific hypotheses were determined for the CRG subjects at follow up, however, PPM correlations were examined to seek further clarification of the overall relationships among variables at the time of follow up.

Affective measures and memory performance.

PPM correlations were used to examine the relationship between affective measures and memory performance for the CRG subjects at follow up. No significant correlations were evident.

Memory performance and memory perception.

PPM correlations were examined to seek further clarification of the relationship between memory performance and memory perception for CRG subjects at follow up (see Table 29).

1) Significant correlations were found between the Anxiety subscale of the MIA and three subtests of the Guild Memory Scale: Recall, Designs, and Retention of Paragraphs. These findings suggest that an increase in subjects' memory performance on these three subtests was associated with less stress related to memory function.

2) A positive correlation was found between the Specific subscale of the MCI and Recall Location of the Supermarket Test, suggesting an increase in subjects' belief that memory losses are specific, and not global, was associated with a corresponding increase in memory performance on the location recall measure.

3) A positive correlation was found between the Alzheimer's subscale of the MCI and the Designs subtest of the Guild Memory Scale,

Table 29

PPM Correlations for Memory Performance and Memory Perception Measures at Follow up for CRG

Memory Perception	Memory Performance								
	Guild Memory Scale						Supermarket Test		
MIA	Recall	Paired Associates	Digits	Designs	Retention of Paragraphs	Retention of Pairs	Recall Location	Recall	Delayed Recall
Change	-.2756	-.0074	-.3291	-.1721	-.3329	-.1930	.0252	-.0788	-.0478
Anxiety	.4259*	.0708	.2394	.1454	.4281*	.1323	.1634	.0985	.0404
Locus	.0846	-.0547	-.0284	-.0205	.0666	.0148	.0736	-.1863	.0117
MCI									
General	.1228	.0579	.2025	-.0692	.0329	.0983	.1079	.1046	.2144
Personal	-.0024	.2168	.2931	.1882	.0022	.2259	-.2067	.0129	.0888
Strategy	-.0123	.1298	.2210	.0088	.0047	.1378	-.1621	.0368	.0335
Effort	.1351	.1127	.3377	.1957	.0768	.1983	.0503	.1738	.2304
Independence	.0976	.2405	.1334	.0663	.0941	.2752	-.2092	.0547	.0718
Specific	.1362	.1881	.1271	.2081	.0971	.2653	.3787*	-.2110	-.0712
Alzheimer's	-.0076	-.1104	-.0232	.3879*	-.0620	-.0647	-.1139	-.0499	-.3154
Goal									
Performance	-.5077**	-.4983**	.1748	-.2177	-.5210**	-.4526**	-.2928	-.2432	-.4041*
Learning	-.0108	-.0757	-.0419	-.0749	-.1404	-.1516	-.0834	-.0644	.0138

Note. N = 45. PPM Correlations = Pearson Product-Moment Correlations. CRG = Cognitive Restructuring Group. MIA = Metamemory In Adulthood. MCI = Memory Controllability Inventory. * = $p \leq .01$ ** = $p \leq .001$.

suggesting an association between the belief against the inevitability of Alzheimer's disease with aging and a corresponding high memory performance score on the Designs subtest.

4) Negative correlations were found between Performance-orientation of the Goal Scale and five performance measures: Recall, Paired Associates, Retention of Paragraphs, and Retention of Pairs of the Guild Memory Scale and Delayed Recall of the Supermarket Test. These findings suggest that a decrease in the beliefs that memory capability automatically deteriorates with age and that there is little one can do to deter the decline were associated with an increase in memory performance on the above measures.

There were no significant correlations between the Supermarket Test (i.e., a measure of memory performance) and the MIA subscales (i.e., a measure of memory perception).

Memory perception and affective measures.

PPM correlations were examined to seek further clarification of the relationship between memory perception and affective symptomatology measures for the CRG subjects at follow up (see Table 30).

1) Positive correlations were found between the Change subscale of the MIA and two measures of affect: C-W of the EMAS-S and the GDS. These findings suggest that the perception that memory abilities are generally stable as one ages was associated with less cognitive-worry component of state anxiety and less depressive symptomatology.

2) Negative correlations were found between the Anxiety subscale of the MIA and three measures of affect: A-E and C-W of the EMAS-S, and

Table 30

PPM Correlations for Memory Perception and Affective Measures at Follow Up for CRG

	Affect		
	EMAS-S		GDS
	A-E	C-W	
Memory Perception			
MIA			
Change	.3323	.3648*	.3542*
Anxiety	-.4524**	-.52809**	-.6341**
Locus	.3066	.0621	.1408
MCI			
General	-.3283	-.0226	-.3634
Personal	-.1061	-.1060	-.2492
Strategy	-.1353	.0426	-.1136
Effort	-.3557*	-.1268	-.2208
Independence	-.0552	-.0060	-.2370
Specific	-.1569	-.0567	.2054
Alzheimer's	.0949	.0316	-.1213
Goal Scale			
Performance	.4411**	.3039	.3021
Learning	.1960	.2922	.2097

Note. n = 45. PPM = Pearson Product-Moment. CRG = Cognitive Restructuring Group. EMAS-S = Endler Multidimensional Anxiety Scale-State. A-E = Autonomic-Emotional. C-W = Cognitive-Worry. GDS = Geriatric Depression Scale. MIA = Metamemory In Adulthood. MCI = Memory Controllability Inventory.

* = $p \leq .01$ ** = $p \leq .001$

the GDS. Since a high score on the Anxiety subscale indicates low anxiety, a negative correlation between scores suggest that fewer feelings of stress related to memory function were associated with less state anxiety and less depressive symptomatology.

3) A negative correlation was found between the Effort subscale of the MCI and the A-E component of the EMAS-S, suggesting that the belief in benefits from applied effort to memory tasks was associated with lower levels of the autonomic-emotional component of state anxiety.

4) A positive correlation was found between the Performance-oriented subscale of the Goal Scale and the A-E component of the EMAS-S, suggesting that less adherence to the belief that memory capability deteriorates with age was associated with less autonomic-emotional component of state anxiety.

There were no significant correlations between the GDS and the MCI, and the GDS and the Goal Scale. Also, there were no significant correlations between the C-W component of the EMAS-S and the MCI subscales, and the C-W component of the EMAS-S and the Goal Scale.

TMG Subjects' Correlations at Posttest

No specific hypotheses were determined for the TMG subjects since this group was used as a comparison group for the CRG, however, PPM correlations were examined to seek further clarification of the overall statistical results.

Affective measures and memory performance.

PPM correlations were used to examine the relationship between affective measures and memory performance for the TMG subjects at posttest. A significant negative correlation was found between A-E and

the Design subscale of the Guild Memory Scale (r = -.3082, $p \leq .01$), suggesting that a high score in autonomic-emotional state anxiety was associated with diminished performance on the Design memory task.

No significant correlations were evident between the C-W component of the EMAS-S and the memory performance measures, and the GDS and the memory performance measures.

Memory performance and memory perception.

PPM correlations were used to examine the relationship between memory performance and memory perception for TMG subjects at posttest. A significant positive correlation was found between Retention of Pairs subtest of the Guild Memory Scale and the Independence subscale of the MCI (r = .3629, $p \leq .01$). Since a low score on the Independence subscale indicates a greater dependence on others to remember, the significant correlation suggests that a greater dependence on others to remember was associated with diminished memory performance on the Retention of Pairs task.

No significant correlations were evident between the Supermarket Test (i.e., a measure of memory performance) and the memory perception measures.

Memory perception and affective measures.

PPM correlations were examined to seek further clarification of the relationship between memory perception and affective symptomatology measures for TMG subjects at posttest (see Table 31).

1) A significant positive correlation was evident between the A-E subscale of the EMAS-S and the Change subscale of the MIA, suggesting that subjects' increase in autonomic-emotional state anxiety was

Table 31

PPM Correlations for Memory Perception and Affective Measures at Posttest for the TMG

	Affect		
	EMAS-S		GDS
	A-E	C-W	
Memory Perception			
MIA			
Change	.3399*	.5282**	.4789**
Anxiety	-.2836	-.4035**	-.3289*
Locus	-.0563	-.0990	.0347
MCI			
General	-.1437	-.1012	-.2049
Personal	-.2082	-.1491	-.1735
Strategy	-.0371	-.1527	-.0976
Effort	-.1214	-.0047	-.1252
Independence	-.1997	-.2051	-.3959**
Specific	-.0843	.1205	-.0770
Alzheimer's	-.3070*	-.0968	-.5356**
Goal Scale			
Performance	.1340	.2680	.1138
Learning	.1549	.1397	.3185*

Note. n = 59. PPM = Pearson Product-Moment. TMG = Traditional Memory Training Group. EMAS-S = Endler Multidimensional Anxiety Scale-State. A-E = Autonomic-Emotional. C-W = Cognitive-Worry. GDS = Geriatric Depression Scale. MIA = Metamemory In Adulthood. MCI = Memory Controllability Inventory.

* = $p \leq .01$ ** = $p \leq .001$

associated with a corresponding increase in the belief that memory abilities decline as one ages.

2) Significant correlations were found between the C-W subscale of the EMAS-S and two subscales of the MIA: Change and Anxiety. The positive correlation between the C-W subscale and the Change subscale suggest that cognitive worry increased along with the belief that memory abilities decline with age. Since low scores on the Anxiety subscale indicate increased anxiety, the significant negative correlation between the C-W subscale and the Anxiety subscale suggest that as cognitive worry increased, anxiety increased correspondingly.

3) Significant correlations were found between the GDS and the following subscales: Change and Anxiety subscales of the MIA; Independence and Alzheimer's subscales of the MCI; and the Learning-oriented subscale of the Goal Scale. These findings suggest that subjects' increase in depressive symptomatology was positively associated with the belief that memory deteriorates with age (i.e., Change subscale). Further, as subjects' anxiety increases (i.e., a low score on the MIA), depressive symptomatology also increases. An increase in depressive symptomatology was associated with the belief that one becomes more dependent on others to remember as one ages (i.e., Independence subscale) and in the inevitability of Alzheimer's disease with aging.

Subjects' increase in depressive symptomatology was positively associated with a corresponding increase in the Learning-oriented subscale. This finding suggests that those who were learning-oriented tended to see memory as multifaceted, and as possible of improving

through effort. This result is contradictory to all other significant results and may be indicative of a Type II error.

No significant correlations were evident between the EMAS-S subscales and the Goal Scale.

TMG Subjects' Correlations at Follow Up

Affective measures and memory performance.

PPM correlations were examined to seek further clarification of the relationship between affective symptomatology measures and memory performance for the TMG subjects at follow up (see Table 32). A significant negative correlation was found between the GDS and the Design subscale of the Guild Memory Scale, suggesting that a high score in depressive symptomatology was associated with diminished performance on the Design memory task. A significant negative correlation was found between the C-W subscale of the EMAS-S and the Retention of Pairs subscale of the Guild Memory Scale. This finding suggests that low scores on the Retention of Pairs subtest was associated with increased cognitive worry.

No significant correlations were evident between the GDS and the Supermarket Test.

Memory performance and memory perception.

PPM correlations were used to examine the relationship between memory performance and memory perception for TMG subjects at follow up (see Table 33). Significant correlations were found between Retention of Pairs subtest of the Guild Memory Scale and two perception subtests: the Change subtest of the MIA and the General subtest of the MCI. The findings suggest that a low score on the Retention of Pairs was

Table 32

PPM Correlations for Affective and Memory Performance Measures at Follow Up for the TMG

	EMAS-S		GDS
	A-E	C-W	
Memory Performance			
Guild Memory Scale			
Recall	-.0053	-.0934	-.2815
Paired Associates	-.0145	-.2794	-.1970
Digits	-.0767	-.0407	-.0261
Design	.0936	-.3140	-.3715*
Retention of Paragraphs	-.0317	-.2586	-.2898
Retention of Pairs	-.1529	-.3761*	.3016
Supermarket Test			
Recall Location	.0288	.0004	-.1427
Recall	.0299	-.1363	.0391
Delayed Recall	.0392	-.1264	.1038

Note. N = 52. PPM = Pearson Product-Moment. TMG = Traditional Memory Training Group. EMAS-S = Endler Multidimensional Anxiety Scale-State. A-E = Autonomic-Emotional. C-W = Cognitive-Worry. GDS = Geriatric Depression Scale.

* = $p \leq .01$.

Table 33

PPM Correlations for Memory Performance and Memory Perception at Follow up for TMG

Memory Perception	Memory Performance								
	Guild Memory Scale						Supermarket Test		
MIA	Recall	Paired Associates	Digits	Designs	Retention of Paragraphs	Retention of Pairs	Recall Location	Recall	Delayed Recall
Change	-.1082	-.0848	-.1709	-.2830	-.2163	-.3450*	.0724	-.2065	-.1163
Anxiety	.1262	.1028	.0458	.2519	.2362	.2061	-.2104	.0315	-.0078
Locus	-.0855	-.1762	-.1013	-.1095	-.0082	-.2485	.0400	.0466	.1103
MCI									
General	.2417	.2802	.1794	.1738	.2827	.3273*	-.0799	.0551	-.0345
Personal	.1916	.1609	.0082	.1015	.2871	.2815	.0196	-.0013	-.0160
Strategy	.3102	.1851	.1122	.1622	.2363	.2115	-.0303	.0414	.0450
Effort	.1113	.1356	.0509	-.1239	.2091	.2930	-.0984	.0170	-.0413
Independence	.0800	.1985	-.0634	.1593	.2973	.2652	-.1494	.0706	.0872
Specific	-.0186	-.1304	.0756	.0373	-.0857	-.0867	-.1286	-.1887	.1016
Alzheimer's	.0912	-.1873	-.2029	.0439	-.1002	-.1002	.3523*	-.2543	-.1752
Goal									
Performance	-.0579	-.1141	.0572	-.1332	-.2502	-.2223	.0636	-.1171	-.1015
Learning	.0877	-.0162	.0550	.0048	-.1152	-.1122	.0606	-.0028	.0308

Note. N = 52. PPM Correlations = Pearson Product-Moment Correlations. TMG = Traditional Memory Training Group. MIA = Metamemory In Adulthood. MCI = Memory Controllability Inventory. * = $p \leq .01$.

associated with a high score on the Change subtest indicating that subjects who scored low on the memory task tended to believe that memory declines with age. A low score on the Retention of Pairs was also associated with a low score on the General subtest suggesting that subjects who scored low on the memory task tended to believe that memory worsened with age. Except for the Retention of Pairs subtest, there were no other significant correlations between the Guild Memory Scale and the memory perception measures.

A significant correlation was seen between the Location Recall of the Supermarket Test and the Alzheimer's subtest of the MCI. The finding suggests that those who scored low on the memory task agreed with the belief of the inevitability of Alzheimer's disease with aging.

Memory perception and affective measures.

PPM correlations were used to examine the relationship between memory perception and affective symptomatology measures for TMG subjects at follow up (see Table 34).

1) Significant correlations were evident between the A-E subscale of the EMAS-S and two subscales of the MIA: Change and Anxiety. These findings suggest that an increase in autonomic-emotional state anxiety was associated with a corresponding increase in the belief that memory abilities decline as one ages (i.e., Change subscale). By contrast, a negative relationship was evident between the A-E and the Anxiety subscale. Since a low score on the Anxiety subtest indicates high levels of anxiety, the suggestion from the findings is that high levels of anxiety were associated with a corresponding decrease in the belief that memory declines with age.

Table 34

PPM Correlations for Memory Perception and Affective Measures at Follow Up for the TMG

	Affect		
	EMAS-S		GDS
	A-E	C-W	
Memory Perception			
MIA			
Change	.3289*	.3764*	.3900*
Anxiety	-.3654*	-.4587**	-.5192**
Locus	.0629	.1667	.0512
MCI			
General	-.1013	-.2472	-.1670
Personal	-.2277	-.1568	-.1465
Strategy	-.1541	-.658	-.1011
Effort	-.2505	-.2500	-.1032
Independence	-.0826	-.2843	-.2268
Specific	.0301	.0909	-.0580
Alzheimer's	-.1992	-.1614	-.3362*
Goal Scale			
Performance	.3003	.3046	.5222**
Learning	.2113	.2297	.4118**

Note. n = 52. PPM = Pearson Product-Moment. TMG = Traditional Memory Training Group. EMAS-S = Endler Multidimensional Anxiety Scale-State. A-E = Autonomic-Emotional. C-W = Cognitive-Worry. GDS = Geriatric Depression Scale. MIA = Metamemory In Adulthood. MCI = Memory Controllability Inventory.

* = $p \leq .01$ ** = $p \leq .001$

2) Significant positive correlations were found between the C-W subscale of the EMAS-S and two subscales of the MIA: Change and Anxiety, suggesting that an increase in cognitive worry was associated with a corresponding increase with the belief that memory abilities decline with age.

There was a significant negative correlation between the C-W subscale and the Anxiety subscale of the MIA. Since a low score on the Anxiety subscale is associated with a corresponding increase in anxiety the findings suggest that as cognitive worry increased, anxiety increased correspondingly.

3) Significant correlations were found between the GDS and the following subscales: Change and Anxiety subscales of the MIA; Alzheimer's subscale of the MCI; and the Performance-oriented and Learning-oriented subscales of the Goal Scale.

An increase in depressive symptomatology was positively associated with a corresponding belief that memory deteriorates with age (i.e., Change subscale). The findings suggest that as the measure of anxiety increased (i.e., a low score on the MIA), depressive symptomatology also increased. Further, findings suggest that an increase in depressive symptomatology was associated with the corresponding belief in the inevitability of Alzheimer's disease with aging.

An increase in depressive symptomatology was positively associated with a corresponding increase in the Performance-oriented subscale. The findings suggest that those with a performance-orientation see memory capability as an entity that automatically deteriorates with aging and little that can stop the decline.

Subjects' increase in depressive symptomatology was positively associated with a corresponding increase in the Learning-oriented subscale. Similar results were seen at posttest and appear contradictory to all other significant findings. Therefore, these results may be indicative of a Type II error.

There were no significant correlations between a measure of affective symptomatology (i.e., EMAS-S) and a measure of memory perception (i.e., MCI). Also, there were no significant correlations between the EMAS-S and the Goal Scale (i.e., a measure of memory perception).

Goal Scale Rankings of Most Important Concerns

Subjects were asked to rank their four greatest concerns regarding memory ability from the suggested 11 concerns on the Goal Scale. Tables 35, 36, and 37 list the four top concerns of the CRG subjects, the TMG subjects, and both groups combined.

The CRG subject's top concern was the same at pretest, posttest, and follow up: "Making mistakes". The TMG's top concern at pretest was: "Making mistakes"; at posttest was: "What I will learn from this"; and at follow up was: "That this will help me in my day-to-day life". The overall top concern was determined by combining the CRG subjects and the TMG subjects. "Making mistakes" was the top concern at pretest, posttest, and follow up.

Multiple Regression Analyses

Multiple stepwise regression analyses were conducted to examine predictors of memory performance at posttest and follow up for two types of memory enhancement treatments. Using the stepwise forward and

Table 35

First Four Top Concerns About Memory Ability in the Cognitive Restructuring Group

	Pretest		Posttest		Follow up	
	Code	%	Code	%	Code	%
First 4 top concerns						
1	1[a]	26.8	1	23.2	1	21.4
2	6[b]	14.3	10[c]	16.1	3[d]	17.9
3	10	14.3	4[e]	14.3	6	12.5
4	3	10.7	6	14.3	10	8.9

Table 36

First Four Top Concerns About Memory Ability in the Traditional Memory Training Group

	Pretest		Posttest		Follow up	
	Code	%	Code	%	Code	%
First 4 top concerns						
1	1[a]	24.6	6[b]	21.3	10[c]	18.0
2	10	24.6	1	19.7	6	16.4
3	3[d]	18.0	3	13.1	1	14.8
4	6 and 8[e]	9.8	4[f] and 8	11.5	3	11.5

a = Making mistakes.
b = What I will learn from this.
c = That this will help me in my day-to-day life.
d = Getting a chance to talk about my mistake, so I can figure out what I did wrong.
e = That my performance is up to par.
f = Being able to do it.

Table 37

First Four Top Concerns About Memory Ability Overall

	Pretest		Posttest		Follow up	
	Code	%	Code	%	Code	%
First 4 top concerns						
1	1[a]	25.6	1	21.4	1	17.9
2	10[b]	19.7	6[c]	17.9	3[d]	14.5
3	3	14.5	4[e]	12.8	6	14.5
4	6	12.0	3, 8[f] and 10	11.1	10	13.7

a = Making mistakes.
b = What I will learn from this.
c = That this will help me in my day-to-day life.
d = Getting a chance to talk about my mistake, so I can figure out what I did wrong.
e = That my performance is up to par.
f = Being able to do it.

backward elimination procedure, variables were eliminated if the probability level associated with the variable's contribution exceeded $p \leq .01$. Posttest scores, follow up scores, and change scores between pretest and posttest were used to examine the relationship between memory performance and several independent variables (i.e., sociodemographic status variables, affective symptomatology variables, and memory perception variables).

No significant predictor variables emerged for the two types of memory treatment, nor for both memory treatments combined. Neither sociodemographic status, affective symptomatology, or memory perception variables could predict memory performance.

Premature Cognitive Commitments: Descriptive Analyses

Descriptive analyses were examined on a one time only basis to explore premature cognitive commitments of older adults. Older adults' preconceived notions about memory ability may influence memory performance in later years by adversely effecting the degree of effort, use of effective strategies, and avoidance of challenging situations (Ryan, 1992). Clarification of premature cognitive commitments contributes to the development of memory exercises and further understanding of cognitive distortions.

Subjects were asked to remember what they thought about memory in the elderly when they were younger. Subjects were allowed to qualify for themselves what was meant by "older" and the extent of memory loss. A summary of the replies was corroborated with several assessors to confirm the investigators overall conclusions.

Many of the older adult subjects when in their thirties did not remember knowing an elderly person with memory difficulties. Those who did remember knowing an elderly person with memory problems most often indicated an individual within the extended family (e.g., elderly aunt, grandparent). When the subjects were in their thirties they most often attributed memory decline to "old age" or "senility". Currently, "old age" was still considered the most common reason for memory problems of the elderly person they had once known. When the subjects were asked if they believed when they were in their thirties that it could happen to them, most replied "no" or that they had never thought about it when they were young. Now, however, they believe it could happen to them, especially once they reached their sixties.

When subjects were asked to predict their current and future levels of memory function two themes appeared. The first theme was hope that their memory would not decline from its current level, and secondly, an expectation that it would decline with aging.

CHAPTER 5

DISCUSSION

The purpose of the study was to develop a memory enhancement training program for community-dwelling older adults aimed at encouraging adaptive beliefs and behaviours about memory function and memory abilities in later life. The study evaluated the effectiveness of cognitive restructuring techniques as compared to implementation of traditional memory training techniques. Cognitive restructuring, as a training procedure, was used to challenge subjects' dysfunctional thoughts or cognitive distortions to demonstrate that memory can be improved, and negative self-conceptions contributing to poor memory performance may be changed. Cognitive restructuring was applied along with an additional focus on attributional retraining (Forsterling, 1980, 1984, 1985, 1986), memory self-efficacy (Bandura, 1977, 1982, 1988), control beliefs (Perlmuter, Monty, & Chan, 1986; Dixon & Hultsch, 1983), and self-conceptions of aging (Elliott & Lachman, 1989a). Attribution retraining focuses on teaching individuals more "favourable" causal attributions, such as attributing failure to insufficient effort instead of lack of ability (Forsterling, 1980, 1984, 1985, 1986). Memory self-efficacy includes beliefs about one's own capability to use memory effectively in a given context (Hertzog, Hultsch, & Dixon, 1989). Control beliefs indicate the extent to which a performance or outcome is believed due to an individual's own volition as opposed to forces outside oneself (Lachman, 1986; Seligman, 1975). Self-conceptions of memory include a set of beliefs concerning one's memory abilities, the degree to which one can exercise control over one's memory, and whether

aging results in irreversible memory loss (Elliott & Lachman, 1989a). An educational component of the memory enhancement training program was given to all subjects to provide information on topics that are recognized as having influence on memory performance. These approaches were used to help community-dwelling older adults gain control over their beliefs about memory and memory performance, and were predicated on the notion which has received substantial support in the past (e.g., Grover & Hertzog, 1991; Lachman, et al., 1987; Lachman & Dick, 1987; Lachman et al., 1992; Rodin, 1987), that control acquisition decreases the possibility that depression or anxiety about perceived memory decline will interfere with optimal memory functioning.

The cognitive restructuring approach was hypothesized to have more positive outcomes for memory enhancement compared to the traditional memory training with older adults especially in terms of limited sustained improvements of memory training over time (Anschutz, Camp, Markley, & Kramer, 1987; Elliott & Lachman, 1989a; Wood & Pratt, 1987). Past research suggests that traditional memory training alone may not enhance positive self-conceptions of memory which may be crucial if the effects of memory training are to have a more pervasive impact on memory performance (Rebok & Balcerak, 1989). The present study is an attempt to enhance positive self-conceptions of memory using cognitive restructuring techniques of training and intervention as a way of addressing limitations of previous memory training enhancement studies, and as a way of understanding the links between memory functioning and memory beliefs in older adults.

Memory Performance Measures

The findings of the present study provide support for the hypothesis that Cognitive Restructuring Memory Training (CRG) results in greater sustained enhancements in memory performance than the Traditional Memory Training (TMG). Although the CRG subjects scored significantly higher at posttest than at pretest on most (i.e., 7 of the 9 subtests) memory performance measures, there was no significant difference between the CRG subjects and the TMG subjects at posttest. It was only at follow up (9 weeks after posttesting) that the CRG subjects demonstrated significantly greater memory performance as compared to the TMG subjects on all except three of the nine memory performance measures (i.e, Retention of Paragraphs subtest of the Guild Memory Scale, and Location Recall subtest and Delayed Recall subtest of the Supermarket Test).

These findings draw attention to a number of important questions, for example, why did the TMG subjects demonstrate no significant improvement on memory performance tasks at posttest as compared to pretest? Why would the CRG subjects sustain improvement in memory performance levels 9 weeks after treatment, while the TMG subjects remained at pretest levels in memory performance? One plausible explanation to account for minimal memory performance improvements demonstrated by the TMG subjects may be the limited extent to which the traditional memory techniques used in previous studies (e.g., DeLeon, 1974) have generalized to transfer tasks. With the exception of the peg-word system as applied to the paired associate tests, the memory performance measures in the present study required transfer of memory

skills to different memory tasks. The findings of minimal memory performance improvements shown by the TMG subjects support the contention of other researchers (e.g., DeLeon, 1974; Elliott & Lachman, 1989a; Weaver, 1990) that a critical limitation of traditional memory training techniques is the lack of generalization to other memory tasks.

Affective Symptomatology Measures

Neither the CRG or the TMG subjects showed a significant increase or decrease in state anxiety or depressive symptomatology at posttest or follow up. However, the TMG subjects showed significantly higher levels of state anxiety and depressive symptomatology than the CRG subjects at posttest. These heightened levels of affective symptomatology returned to near pretest levels at follow up. Dittmann-Kohli, Lachman, Kliegl, and Baltes (1991) found in their older adult sample that one-shot cognitive testing produced negative changes in self-efficacy. They speculated that testing without providing feedback to the subject may have negative effects on self-conceptions. In the present study, also, it is conceivable that lack of feedback during the assessment may have negatively affected self-efficacy perception. Perhaps the anticipation that memory should improve once the strategies were learned heightened the subjects' expectations of outcomes, thus exacerbating feelings of anxiety and depression about one's memory.

Memory Perception Measures

The CRG subjects scored in the direction of significantly greater beneficial memory perceptions at posttest than at pretest on nine of the twelve memory perception measures. The CRG subjects scored significantly higher on measures reflecting memory abilities as stable

over time and the belief that subjects have personal control over remembering. These improved changes at posttest in memory perception as measured by the two subscales of the MIA (i.e., Change and Locus) are inconsistent with findings of an earlier study (Weaver, 1990) in which the MIA was stable over time. However, Weaver (1990) found little support for her hypothesis that the combined memory strategy training and attribution training result in enhancements in memory performance and self-conceptions about memory. Therefore, it appears that the CRG techniques applied in the current study were perhaps more effective in changing beliefs about memory than were techniques that combined memory strategy training and attribution training.

In the present study, the CRG subjects also scored significantly higher at posttest than at pretest on measures of the MCI. Higher scores on the MCI imply subject's belief that memory need not decline with age, that an individual can improve one's memory, and that the individual upholds a greater sense of independence about memory function. The CRG showed an increased perception of memory as having several entities as opposed to being a unitary process. The CRG subjects were less fearful about Alzheimer's disease. These changes for the CRG subjects were stable over the 9 week follow up period.

The CRG subjects compared to the TMG subjects also attained significantly higher levels of memory controllability at posttest in perceived control over memory and the importance to applying strategies and effort toward remembering. The importance of applying strategies and effort remained significantly higher for the CRG subjects as

compared to the TMG 9 weeks after the posttest. The CRG subjects also remained significantly less fearful about Alzheimer's disease.

The CRG subjects demonstrated a significant drop in performance-oriented thinking at posttest. Nine weeks after treatment this same group demonstrated significantly higher levels of learning-oriented thinking. This finding suggests, at least tentatively, that the CRG subjects were less likely to perceive memory capability as an entity that automatically deteriorates with age, and more likely to perceive memory as multifaceted, and as possible of improving through effort. It is noteworthy that at follow up the CRG subjects compared to the TMG subjects attained higher scores on two memory perception subtests (i.e., less fearful about Alzheimer's disease and greater learning-oriented thinking). Analysis of the mean scores at follow up shows that the CRG subjects held constant the gains which were made at posttest on one of the subtests (i.e., indicating less concern about Alzheimer's disease), whereas the TMG showed the greatest concern about Alzheimer's disease at follow up.

It is possible that social desirability was a factor for the CRG subjects' increase in beneficial memory beliefs at posttest. Ten weeks of learning about negative beliefs and attributions may have influenced subjects to endorse items that reflect more socially appropriate attributes and positive beliefs. Clarification of the effects of social desirability would be beneficial in future research.

Correlational Relationships Between Memory Performance, Memory Perception, and Affective Symptomatology

Significant correlations were evident between measures of memory performance, memory perception, and affective symptomatology for the CRG subjects and the TMG subjects. Subjects who scored higher levels of state anxiety (i.e., Cognitive-worry) and anxiety specifically pertaining to memory function (i.e., Anxiety subscale of the MIA) at pretest scored lower on several memory performance tasks. Further, subjects who scored higher levels of depressive symptomatology scored lower on two measures of memory performance: immediate and delayed recall of text. Therefore, at pretest there was a negative association between affective symptomatology and memory performance on several measures. Negative associations between affective symptomatology and several memory performance tasks were also evident at posttest and follow up. These results are consistent with the literature stating the aversive affects of anxiety and depressive symptomatology on memory performance (Labouvie-Vief, 1976; Poon, 1986; Yesavage, 1984; Yesavage, Rose, & Spiegel, 1982; Zarit, Cole, & Guider, 1981).

The measures of state anxiety and a measure of anxiety specifically about memory were predictably associated, since they are both measures of anxiety. Significant correlations for anxiety measures were evident for all groups at pretest, posttest, and follow up. This was particularly true for subjects' scores on the Cognitive-Worry subscale of the state anxiety measure and the measure of anxiety pertaining to memory. Subjects' scores on a measure of autonomic-emotional signs of state anxiety were less consistently and

significantly associated with anxiety about memory function. Therefore, it appears that self-statements about memory are associated to levels of anxiety pertaining to memory function. An implication of these findings for memory enhancement training programs of older adults is that state anxiety recorded by the subjects may be experienced in the form of cognitive-worry, or self-statements about memory. Intervention programs may attempt to lower a subject's anxiety by identifying these self-statements about memory and replacing them with more productive and motivating self-statements, and thereby lower the levels of anxiety. Cognitive restructuring is one technique which may be used to implement cognitive change.

Anxiety aimed at memory function and levels of depressive symptomatology was positively correlated at pretest, posttest, and follow up for all groups of subjects. Subjects' increased depressive symptomatology was associated with a corresponding increase in levels of anxiety about memory function and vice versa. This is consistent with the premise of several researchers (e.g., Labouvie-Vief, 1976; Yesavage, Rose, & Spiegel, 1982; Zarit, Cole, & Guider, 1981) that concern about one's memory capabilities may contribute to and stem from feelings of depression. The current study provided further evidence of the association, although not causal, between depressive symptomatology and levels of anxiety about memory function. Implications for future memory training programs for older adults include addressing more directly the anxiety that older adults report about their memory abilities, and a systematic approach to reducing these anxieties such as the use of cognitive restructuring.

Pretest results of all subjects combined also indicated that state anxiety was positively associated with the belief of memory deterioration with old age, feelings of stress about memory function, less perceived control about memory aging, necessary dependence on others for memory capabilities with aging, and the belief that memory controllability decreases with age. The belief that memory inevitably declines with age was positively correlated with a measure of state anxiety for all groups at pretest, posttest, and follow up.

Subjects' performance on Delayed Recall of the Supermarket Test was associated at pretest with several beliefs about memory: the belief that memory declines with age, anxiety provoking thoughts about memory, and the belief that there is little one can do to deter declining memory. However, there were no significant associations at posttest and follow up. One plausible explanation for the subjects' positive correlations at pretest only may be due to the unexpected request to recall as many grocery items as possible. At posttest and follow up, however, the subjects were familiar with the memory task since they had experienced it at pretest, and therefore were able to anticipate that 20 minutes after the initial Recall task he or she would be required to name as many grocery items as possible. These results are consistent with the premise of several researchers (Barrett & Wright, 1981; Poon & Fozard, 1978) that older adults tend to perform less well on tasks that are unfamiliar to them.

State anxiety was positively associated with the Goal Scale at pretest. Subjects completing the Goal Scale were requested to rate how concerned they would be imagining themselves in a situation where they

must remember people's names and faces. Although each statement is a reflection of performance-orientation or learning-orientation, it is a measure of concerns about memory. Therefore, it is not surprising to note that state anxiety was positively associated with the Goal Scale at pretest. Also, state anxiety was positively associated with performance-orientation (but not with learning-orientation) for the CRG at posttest and follow up. Therefore, state anxiety was positively correlated with concerns about one's memory performance as compared to others and the inevitable deterioration of memory with age. This constitutes further evidence that future memory training programs for older adults may be more effective in enhancing memory by replacing performance-oriented thinking with learning-oriented thinking.

Another finding on the Goal Scale that is worthy of discussion includes the CRG subjects' results at posttest and follow up. There was a negative association between the performance-oriented subscale and several memory performance measures. Subjects who perceived memory as inevitably declining with age and compared themselves with others, performed worse on memory performance than those who scored lower on the performance-orientation scale.

The Goal Scale also provided an opportunity for subjects to list their first four top concerns about memory ability with aging. The concern that rated upper most for the CRG subjects was the same at pretest, posttest, and follow up: concern about "making a mistake". The TMG subjects' upper most concern at pretest was also "making a mistake". However, at posttest the TMG subjects' greatest concern shifted to "what will I learn from this". The upper most concern of the TMG

subjects at follow up was "that this will help me in my day-to-day life". At first glance, it appears as though the subjects who received the traditional memory strategies were more learning-oriented. However, on further reflection it would appear that these same subjects were also expressing a concern which has been determined as a shortcoming of the traditional memory training techniques - the practical application of memory techniques (Elliott & Lachman, 1989a).

Premature Cognitive Commitments

On a one time only basis, preconceived notions of memory performance of older adults were evaluated by asking subjects to remember what they thought about memory in the elderly when they were younger. Results of the verbatim inquiry supported Chanowitz and Langer's (1981) proposition that the initial exposure to information impacts on its subsequent use. Chanowitz and Langer (1981) proposed that when individuals are exposed to information that appears irrelevant at the time, that the information may not be critically or mindfully evaluated, therefore reducing the likelihood of the person to identify alternative explanations.

Frequently young persons in our culture are exposed to a view of old age as being a time of deterioration, as opposed to wisdom or increased experiential competence (Perlmutter, 1988). This view of memory decline associated with old age may lie dormant in the young adulthood and middle adulthood years until the individual is older and experiences forgetting. The premature cognitive commitment of the idea that old age implies a downward trajectory (Fry, 1986; Zarit, 1981) may

impact on the older adult's memory performance regardless of actual impairment.

Further, results of the current study indicate that although many subjects hoped that their memory would not deteriorate with time, most believed that it would. Therefore, premature cognitive commitments may not only affect current memory performance, it is likely that they will affect future memory functioning. Memory training programs incorporating cognitive restructuring to challenge dysfunctional believes about memory and aging is a preventative approach to counter the negative effects of premature cognitive commitments.

Educational Component of Treatment

The educational component of the treatment program provided all subjects with an opportunity to obtain basic educational information about memory abilities and memory functioning. The exact affects of the educational component are not known since all treatment groups received the same educational information. However, feedback gathered from subjects who wrote informal evaluations at the completion of the memory classes reported that the educational component of the memory classes provided interesting and informative facts about memory even when the memory strategies (i.e., traditional memory training strategies or cognitive restructuring strategies) were still formulating in their minds.

Further, it is comprehensible that the educational component may change belief systems about memory in aging, including beliefs comprising of premature cognitive commitments. Since it is likely that premature cognitive commitments affect current and future memory

performance, the educational component should be universally maintained in memory treatment programs. Future research should clarify the effects of specific educational topics on memory performance and memory perception.

Informal Class Evaluation

Class evaluations were given at the end of each wave to determine how subjects felt about the memory enhancement training classes. Written evaluations and comments from the participants suggested that overall a therapeutic relationship had been established between the trainers and subjects, and that the subjects were satisfied with the procedures and content of the memory classes. The informal class evaluations also provided the opportunity to gain further understanding of the effects of the training procedures.

Several TMG subjects expressed concern that many of the mnemonic strategies did not seem useful in their daily lives. Although the subjects were willing to learn the techniques, some subjects were doubtful that they would be able to apply the strategies outside the memory classes. It is possible that the traditional memory techniques seemed irrelevant and less interesting to the TMG subjects, and therefore adversely affected motivational factors. This may have contributed to the increase in negative affective symptomatology and negative memory perceptions at posttest.

Comments from the informal class evaluations of the CRG subjects suggested that as a result of challenging dysfunctional thoughts about memory, subjects tended to use memory skills that they had prior to involvement in the memory classes. Therefore, it is possible that the

increase in memory performance measures may have been due to more effective use of previously learned skills that contribute to better remembering including not only mnemonic techniques, but also organizational skills and greater effort toward attending. It would be beneficial to determine the extent that the cognitive restructuring memory training subjects spontaneously apply previously learned memory skills. An implication of these findings suggest that cognitive restructuring techniques applied prior to or in conjunction with traditional memory training strategies may be the most effective approach for memory enhancement programs for older adults in the community.

Limitations of the Research Study

Volunteer Nature of the Sample and Attrition

The present study was confined to a volunteer sample which affects the process of random sampling. Seniors who volunteer differ in several ways from those who choose not to volunteer. According to a government document (Statistics Canada, 1989), the rate of volunteering is approximately 22% for persons aged 65 and over. There is a higher proportion of women (i.e., 64%) among elderly volunteers than men. This may be explained in part by the fact that there are more women than men this age in the population.

A number of studies have addressed the limitations of a volunteer sample (Norris, 1987; Schleser, West, & Boatwright, 1986). For example, attrition was inevitable in the present study since the research sample comprised a community-dwelling volunteer sample. When compared to other memory training studies with older adults, a 26% attrition rate for the

present study is relatively low. For example, previous memory training studies report attrition rates of 17.6% (Schleser, West, & Boatwright, 1986), 30% (Schaffer & Poon, 1982), and 62.5% (Schleser, West, & Boatwright, 1986). Understanding reasons for attrition and concern about the effects of attrition have encouraged researchers to investigate the issue (Lapp, 1983; Norris, 1987; Schleser, West, & Boatwright, 1986).

Schleser, West, and Boatwright (1986) explored the effectiveness of a variety of strategies for recruiting older adults as participants in a memory training program, and to determine characteristics of those persons most likely to complete the program. Schleser et al., (1986) found that there were more volunteers after an oral presentation given at an apartment building meeting, but those who responded after seeing information printed on a poster mounted in a prominent place were more likely to complete the training. Older adults who were the least likely to complete the program were those who responded to direct contact (i.e., flyers distributed to their mailbox or handed to them as they entered the lobby of their apartment building). The present study attempted to recruit volunteers using multiple vehicles of attention, thereby attracting as many individuals as possible.

Lapp (1983) perceives commitment as an essential ingredient in memory training, although it "... is evasive in the elderly as is their desire to stay in the wings and yet be on stage" (p. 58). The effects of feeling challenged and threatened in a learning and testing situation may be resistance to accepting alternative views and strategies, disbelief that these alternatives can be useful, and a tendency to quit

if positive results are not immediately evident, or if levels of frustration are too high.

Attrition may threaten the validity of a research study. When attrition is selective, it may affect the accuracy of sample data (Norris, 1987). It may affect the characteristics of the sample, thereby biasing prevalence rates and reducing the generalizability of findings. For example, attrition may result in samples that have higher intellectual capacities, or better economic conditions than the populations they represent.

In the present study it is possible that reasons for attrition in the traditional memory training group were different than in the cognitive restructuring group. For example, according to the informal class evaluations of the TMG subjects, the traditional memory techniques may have seemed irrelevant and less interesting to some of the subjects, and may have resulted in attrition. However, feedback from the informal class evaluations of the CRG subjects suggested that there was too much focus on identifying cognitive distortions in the first several weeks of the classes, and not enough emphasis on replacing the dysfunctional thoughts with learning-oriented and motivating thoughts. Focus on identifying cognitive distortions at the early stages of the cognitive restructuring memory training classes may have resulted in attrition of several CRG subjects.

The exact affects of volunteer characteristics and attrition for the current community-dwelling older adult sample are unknown. However, the large sample size and relatively low rate of attrition is at least comparable to those in studies of similar research design. In

Verhaeghen, Marcoen, and Goossens' (1992) overview of research on memory training, 67 studies were cited as involving only between 5 and 102 subjects. The attrition rates for these same studies are unlisted.

No-treatment Control Group

The current study did not include a no-treatment control group, instead the traditional memory training approach was considered as a comparison group. The majority of memory training studies, including some of the most influential research in memory training with older adults (Kliegl, Smith, & Baltes, 1989; Yesavage, Lapp, & Sheikh, 1989), have not included a no-treatment control group. Verhaeghen, Marcoen, and Goossens (1992) conducted a meta-analytic study of memory training research with older adults. Seventy percent of the 67 studies in their analysis did not include comparisons with a no-treatment control group.

One explanation for exclusion of a no-treatment control group is that the focus of memory training is to consider treatment gains and intraindividual differences rather than posttest differences between groups (Verhaeghen et al., 1992). Although it may have been informative to have had a no-treatment control group or a wait-control group, there were practical and ethical considerations.

The present researcher's decision to not include a no-treatment control group or a wait-control group was guided by concerns about the ethical implication of denying some portion of subjects the opportunity to receive minimal memory training. The advantages of insuring that all subjects received some form of intervention far out weighed the disadvantages of adhering to an experimental design in which there was no provision for a no-treatment control group or a wait-control group.

Standard Health Screening

Since completion of the data collection phase of the current research, Christensen, Moye, Armson, and Kern (1992) have devised the Health Screening Questionnaire specifically relevant for cognitive aging research. Christensen et al. (1992) surveyed 197 cognitive studies that included a normal sample of older adults appearing between 1984 and 1990 in four journals which frequently publish articles pertaining to older adults. Only 10% described specific exclusionary criteria based on health conditions related to cognitive functioning. Sixty-four percent of the articles described subjects' health status as "normal" or "healthy" based on global self-ratings frequently after entry into the study. No information on health status was provided in 25% of the articles. Only 1% of the articles mentioned the number of subjects excluded on the basis of health status.

With respect to screening procedures used in the present study, it is important to draw attention to the fact that 25 or 8% of the volunteers were excluded with physical conditions that may result in secondary complications affecting cognitive functioning (Dahl, 1983; Sands & Meredith, 1992; Triscott, 1990). Self-report appears to be a practical and valid method for assessing the presence of medical conditions (Ferraro, 1980; Ford, Folmar, Salmon, Medalie, Roy, & Galazka, 1988). However, future research should take advantage of a standard instrument such as the Health Status Questionnaire (Christensen et al., 1992).

Assessment Delays

The average number of days that an assessment preceded memory treatment onset was 14.5 days. The average number of days that an assessment followed treatment was 9 days. Follow up occurred 9 weeks after the treatment ended. Assessors attempted to test each subject shortly before the memory classes began and immediately after the memory classes ended, however, subjects were not always promptly available even with several weeks notice. Family commitments, travel, and illness were the three most common reasons for delays in the assessments.

Changes that occurred from memory training may have diminished with time, or may have been influenced by intervening factors unrelated to the intervention. However, the CRG subjects demonstrated improvements in memory performance at posttest suggesting that the CRG treatment was robust enough to demonstrate its effects at posttest, even after a delay in the assessments. Further, the improvements in memory performance were sustained 9 weeks later. Future research designs should attempt to eliminate delays in assessment implementation.

Importance and Implications of the Research Findings for Intervention

The primary importance of the present study lies in the finding that use of cognitive restructuring techniques can help community-dwelling older adults gain control over beliefs about memory and enhance their memory performance. This, in turn, may decrease the possibility that depression or anxiety about perceived memory decline will interfere with optimal memory functioning.

Optimal memory functioning and beneficial beliefs about memory contribute vitally to the quality of life and mental health of older

adults living in the community. A memory enhancement program which includes cognitive restructuring techniques may be a more effective preventative and viable approach toward addressing concerns about cognitive decline in the later years, than would a traditional memory approach.

Suggestions for Further Research

Results from this study suggest several directions for further research. First, the CRG subjects significantly improved their memory performance at posttest as compared to pretest. However, there was no significant difference between the TMG subjects and the CRG subjects at posttest, although there was a significant difference between the two types of memory training at follow up. Future research may help to clarify factors that contributed to the significant differences between the two groups at follow up. It is encouraging, however, that the CRG subjects demonstrated significant improvements in their memory at posttest as compared to pretest.

Secondly, cognitive restructuring techniques applied prior to or in conjunction with traditional memory training strategies may yield even greater memory improvement results than either method employed separately. Individuals who approach tasks with a positive frame of mind and use cognitive restructuring techniques to instil in themselves that learning a new skill will be beneficial for enhancing memory performance, may be more motivated to learn the skill than those who believe that there is little they can do to improve their memory. A recent study (Lachman et al., 1992) has shown that using self-generated memory strategies combined with a cognitive restructuring intervention

are effective for improving older adults' beliefs about memory controllability. Lachman et al. (1992) found that memory performance of the combined intervention group subjects, however, did not improve significantly more than the no-contact control group over the 3 hours of cognitive restructuring treatment. It is possible that this amount of time was not enough to learn cognitive restructuring techniques or for such treatment to take hold. It would be of interest to investigate the course of maintenance over time and generalization across tasks for a combined traditional memory training and cognitive restructuring treatment approach in future research.

Thirdly, it may be beneficial to assess memory changes using instruments which reflect memory tasks of every day living (Cockburn & Smith, 1991; Poon, Rubin, & Wilson, 1989). Understanding ways older adults approach memory tasks they are likely to meet in everyday life, and the situations in which difficulties are likely to occur is of practical importance. Relevance of the assessment measures needs to be considered since this may affect motivation and performance. These daily living memory measures need to be standardized with at least three equivalent forms so as to measure sustained memory function after posttesting, and to avoid confounding memory improvements with practice effects.

Fourthly, the present study included only healthy community-dwelling older adults with little or no depressive symptomatology. Although cognitive restructuring is not necessarily appropriate for those with severe dementia (Yost, et al., 1986), the question of whether the techniques of cognitive restructuring would enhance memory when

applied to individuals with a mild form of dementia or a moderate depression? This issue has not been addressed in the present study but is deserving of attention in future research.

Further, active participation of caregivers during memory training is an untouched area of research. Although involving caregivers in the intervention of the elderly is not unique (Fry, 1986), little research has included caregivers as reinforcers by involving them actively during the acquisition of cognitive restructuring of dysfunctional thoughts.

Lastly, a greater understanding of premature cognitive commitments may lead to an active mandate to educate youth about memory abilities over the life span. The goal would be to prevent faulty beliefs about memory and aging from interfering with optimal memory performance.

Conclusion

The use of cognitive restructuring techniques in conjunction with interventions derived from the literature on self-efficacy, attributional retraining, control and aging, and self-conceptions of aging resulted in a significant acquisition of beneficial beliefs about memory and sustained improvements in memory performance. Replication of this study and clarification of the critical components of cognitive restructuring and memory training is necessary, however, the results of the present study draw attention to a new direction in memory enhancement for the elderly.

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APPENDICES

APPENDIX A

Seniors' Clubs and Organizations

Seniors' Clubs and Organizations

Bowness Seniors
Brentwood Seniors
Confederation Park Seniors Citizen's Centre
Crescent Heights Seniors
Cross Road Seniors
Forest Lawn Seniors
Fully Alive
Golden Age Club
Good Companion
Gulf Canada Resources Limited Annuitant's Club
Kerby Centre
Mobil Oil Annuitant's Club
Ogden House
Parkdale Nifty Fifties Club
Pioneer Club
Renfrew Seniors
Richmond Seniors
Shell Canada Limited Annuitant's Club
Sunalta Seniors
Triwood Seniors

Seniors' Newsletters

Bow Cliff Seniors Newsletter
Confederation Park Senior Citizens Newsletter
Golden Age Newsletter
Kerby News

City Newspaper

Calgary Herald Neighbours

Seniors' Magazine

Club 55

Local Cable Television Station

Cable 10

Seniors' Lodges and Apartment Complexes

Confederation Park Apartments
Jewish Centre Apartments
Renoir Mansion
Trinity Lodge

APPENDIX B

Screening Measures

INFORMED CONSENT FORM

I, _____, consent to participate in the study being undertaken by Ph.D. student, May Caprio-Prevette, under the supervision of Dr. P. S. Fry of the University of Calgary. I have been informed that the study is designed to explore ways and means of helping individuals improve their memory functioning. I have also been informed that as a participant it is possible that I may be assigned to another research assistant acting on behalf of May Caprio-Prevette and Dr. P. S. Fry.

I understand that my participation in this reserch is completely voluntary and that no guarantees whatever are being provided that the techniques being used in the research will be successful for me as an individual. I understand that all treatment groups will meet weekly over a 10 week period for a total of 20 hours.

I understand that all information emerging from my participation in this study will be held in strict confidence and that my name or address will not be mentioned in any written or oral report that is developed as a part of the study.

The nature of the procedure to be used and the objectives of May Caprio-Prevette's study have been explained to me and I have had a chance to raise questions about the study.

I reserve the right to terminate my participation in the study at any time without being required to state a reason and to refuse to answer any questions which I regard to be an invasion of my right to privacy of information.

I voluntarily consent to participate in the study.

Signiture _____

Address _____

Phone _____

PERSONAL DATA SHEET

Subject's Number: _____
Subject's Name: _____ (optional)
Subject's Address: _____ (optional)

Interviewer: _____
Interview Date: _____
Location: _____

Subject's Sex: M / F
Date of Birth: _____ Age: _____
Place of Birth: _____ Immigration: ___NO ___YES
(yr. _____)
Mother Tongue: _____

Educational Background: ___Elementary School ___Secondary School
___Post Secondary

Family Status: ___Single (never married)
___Married (no. of times: ___)
___Divorced or Separated (no. of times: ___)
___Widowed (no. of times: ___)

Contact with children or grandchildren, at least:
4 = once a day; 3 = once a week; 2 = once a month;
1 = once a year or less

Social activities and contact with friends at least:
4 = once a day; 3 = once a week; 2 = once a month;
1 = once a year or less

Residence: Most of your life has been spent in:
1 = rural or small farm; 2 = small town; 3 = major city
(specify: _____)

Last change in residence occurred:
1 = in the past year; 2 = in the last 5 years; 3 = in the past 10 years;
4 = other (_____)

Current living arrangement:
1 = alone; 2 = with a partner; 3 = with spouse; 4 = with family

PERSONAL DATA SHEET (continued)

Profession/Occupation:_____

_____

Retirement: Date_____ Age: _____

Socio-economic Status (subjective) :
1 = lower middle class; 2 = middle class; 3 = upper middle class;
4 = upper class

Describe medical history:_____

_____

Please indicate if you are presently on medications:

_____

_____

Have you experienced any difficulties with your memory?
1 = none; 2 = minor (specify:_____)
3 = moderate (specify:_____)
4 = major (specify:_____)

If so, please indicate which events are more difficult for you to remember?
1 = recent events; 2 = events from the remote past; 3 = both; 4 = none

Please specify where you first learned about this research:
1 = newspaper; 2 = T.V. advertisement; 3 = bulletin board advertisement;
4 = other (specify: _____)

Why have you decided to participate in this study? _____

_____

MENTAL STATUS QUESTIONNAIRE

Read to client: "I'd like to get an idea of how your memory is by asking some questions.

1. Where are you now? ("What place is this?" "What is the name of this place?" "What kind of place is it?" Keep asking questions until the person can give full information.)

2. Where is this place located (Address: "What streets are outside?" Score correct if subject names a major street nearby.)

3. What is the date today:
   Day of the month _____

4. Month _____

5. Year _____

6. How old are you? _____

7. When were you born? Month _____

8. Year _____

9. Who is the Prime Minister of Canada? _____

10. Who was the Prime Minister before him? _____

(Adapted from Kahn, Goldfarb, Pollack & Peck, 1960)

CENTER FOR EPIDEMIOLOGIC STUDIES DEPRESSION (CES-D) SCALE

Circle the number for each statement which best describes how often you felt or behaved this way - DURING THE PAST WEEK.

	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time	Most or all of the time (5-7 days)
DURING THE PAST WEEK:				
1. I was bothered by things that usually don't bother me	0	1	2	3
2. I did not feel like eating; my appetite was poor	0	1	2	3
3. I felt that I could not shake off the blues even with help from my family or friends	0	1	2	3
4. I felt that I was just as good as other people	0	1	2	3
5. I had trouble keeping my mind on what I was doing	0	1	2	3
6. I felt depressed	0	1	2	3
7. I felt that everything I did was an effort	0	1	2	3
8. I felt hopeful about the future	0	1	2	3
9. I thought that my life had been a failure	0	1	2	3
10. I felt fearful	0	1	2	3
11. My sleep was restless	0	1	2	3

CES-D (continued)

	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time	Most or all of the time (5-7 days)
12. I was happy	0	1	2	3
13. I talked less than usual	0	1	2	3
14. I felt lonely	0	1	2	3
15. People were unfriendly	0	1	2	3
16. I enjoyed life	0	1	2	3
17. I had crying spells	0	1	2	3
18. I felt sad	0	1	2	3
19. I felt that people disliked me	0	1	2	3
20. I could not get 'going'	0	1	2	3

WAIS-R VOCABULARY TEST

1. Bed
2. Ship
3. Penny
4. Winter
5. Breakfast
6. Repair
7. Fabric
8. Assemble
9. Enormous
10. Conceal
11. Sentence
12. Consume
13. Regulate
14. Terminate
15. Commence
16. Domestic
17. Tranquil
18. Ponder
19. Designate
20. Reluctant
21. Obstruct
22. Sanctuary
23. Compassion
24. Evasive
25. Remorse
26. Perimeter
27. Generate
28. Matchless
29. Fortitude
30. Tangible
31. Plagiarize
32. Ominous
33. Encumber
34. Audacious
35. Tirade

APPENDIX C

Assessment Measures

GUILD MEMORY TEST - FORM A

NAME_____ SEX_____ AGE_____ DATE_____

PARAGRAPH I

New York, / September / 28th, / The Century / Theatre / on Columbus / Street / will offer / a festival / of old time / favourites / of silent / film / days. / Many well-known / actors / and actresses / of by-gone years / will put in / a personal / appearance. /

Initial Recall _____

Second Recall _____

PAIRED ASSOCIATES

1)	Table	Stool	____	____
2)	Dog	Lion	____	____
3)	Tree	Cold	____	____
4)	Flower	Tulip	____	____
5)	Cup	Smile	____	____
6)	House	Book	____	____
7)	Coal	Ear	____	____
8)	Wind	Ink	____	____
9)	Paper	Earth	____	____
10)	Pen	Tooth	____	____
		Score	____	____

	Raw Score	Scaled Score
In. Recall of Par. 1. _____ 2. _____ average	_____	_____
Paired Associates	_____	_____
Digits	_____	_____
Designs	_____	_____
Ret. of Par. 1. _____ 2. _____ average	_____	_____
Ret. of Paired Assoc.	_____	_____
WAIS VOCABULARY SCORE	_____	_____

PARAGRAPH II

Cape Sable / Light,/ Two men / escaped injury / yesterday / when their twin-engined / light / plane / made an emergency / landing/ in the turbulent / ocean / fifty / yards / off the tip / of Everglades / National Park. / Despite freezing water / both the aviators / were able to swim / ashore / safely. /

Initial Recall _____

Second Recall _____

DESIGNS: 4___ 6___ 8___ 10___ 1___ 3___ 5___ 7___ 9___ 2___

DIGIT SPAN SCORE WAIS VOCABULARY SCORE___

Digits Forward	Circle
4 - 8 - 1	3
5 - 2 - 4	3
6 - 2 - 4 - 9	4
8 - 3 - 9 - 6	4
4 - 1 - 6 - 5 - 1	5
6 - 4 - 7 - 3 - 6	5
7 - 1 - 9 - 3 - 7 - 2	6
4 - 7 - 1 - 5 - 9 - 8	6
5 - 9 - 1 - 6 - 4 - 1 - 8	7
5 - 1 - 8 - 6 - 2 - 7 - 5	7
5 - 8 - 1 - 7 - 2 - 5 - 4 - 9	8
2 - 8 - 3 - 9 - 4 - 7 - 1 - 5	8
3 - 7 - 5 - 9 - 6 - 2 - 4 - 8 - 3	9
7 - 1 - 3 - 8 - 5 - 2 - 4 - 7 - 6	9
Digits Reversed	
1 - 5	3
6 - 9	3
5 - 1 - 8	4
5 - 2 - 6	4
4 - 2 - 6 - 8	5
3 - 8 - 5 - 7	5
2 - 5 - 1 - 7 - 4	6
7 - 1 - 9 - 5 - 2	6
4 - 2 - 9 - 5 - 8 - 1	7
6 - 1 - 4 - 7 - 5 - 8	7
8 - 2 - 3 - 7 - 2 - 6 - 5	8
3 - 7 - 4 - 8 - 1 - 3 - 8	8
8 - 2 - 3 - 6 - 7 - 1 - 6 - 9	9
8 - 1 - 7 - 2 - 8 - 5 - 6 - 3	9

DF_____ + DR_____ = _____
Highest numbers circled

GUILD MEMORY TEST - FORM B

NAME_____ SEX_____ AGE_____ DATE_____

PARAGRAPH I

Boston, / October / 14th, / The Apollo / Theatre / on Center / Avenue / will present / a new / play / by John Milner / the famed / social / playwrite. / The comedy / deals / amusingly / with local / social conditions. /

Initial Recall _____

Second Recall _____

PAIRED ASSOCIATES

1)	Desk	Choir	____	____
2)	Cat	Wolf	____	____
3)	Bush	Warm	____	____
4)	Blossom	Rose	____	____
5)	Fork	Grin	____	____
6)	Church	Read	____	____
7)	Wood	Nose	____	____
8)	Storm	Led	____	____
9)	Cloth	Ocean	____	____
10)	Pencil	Thumb	____	____
		Score	____	____

	Raw Score	Scaled Score
In. Recall of Par. 1. _____ 2. _____ average	_____	_____
Paired Associates	_____	_____
Digits	_____	_____
Designs	_____	_____
Ret. of Par. 1. _____ 2. _____ average	_____	_____
Ret. of Paired Assoc.	_____	_____
WAIS VOCABULARY SCORE	_____	_____

PARAGRAPH II

Wichita, / Kansas, / Tornado / warnings / went up again today / after the storm / failed to materialize / yesterday. / At about 4 P.M. / two tornadoes / struck / the outskirts of the city / almost simultaneously / causing much destruction / and flooding. / No critical injuries / were reported / but 50 / families / were stranded / without homes. /

Initial Recall _____

Second Recall _____

DESIGNS: 4___ 6___ 8___ 10___ 1___ 3___ 5___ 7___ 9___ 2___

DIGIT SPAN SCORE WAIS VOCABULARY SCORE___

Digits Forward	Circle
4 - 8 - 1	3
5 - 2 - 4	3
6 - 2 - 4 - 9	4
8 - 3 - 9 - 6	4
4 - 1 - 6 - 5 - 1	5
6 - 4 - 7 - 3 - 6	5
7 - 1 - 9 - 3 - 7 - 2	6
4 - 7 - 1 - 5 - 9 - 8	6
5 - 9 - 1 - 6 - 4 - 1 - 8	7
5 - 1 - 8 - 6 - 2 - 7 - 5	7
5 - 8 - 1 - 7 - 2 - 5 - 4 - 9	8
2 - 8 - 3 - 9 - 4 - 7 - 1 - 5	8
3 - 7 - 5 - 9 - 6 - 2 - 4 - 8 - 3	9
7 - 1 - 3 - 8 - 5 - 2 - 4 - 7 - 6	9
Digits Reversed	
1 - 5	3
6 - 9	3
5 - 1 - 8	4
5 - 2 - 6	4
4 - 2 - 6 - 8	5
3 - 8 - 5 - 7	5
2 - 5 - 1 - 7 - 4	6
7 - 1 - 9 - 5 - 2	6
4 - 2 - 9 - 5 - 8 - 1	7
6 - 1 - 4 - 7 - 5 - 8	7
8 - 2 - 3 - 7 - 2 - 6 - 5	8
3 - 7 - 4 - 8 - 1 - 3 - 8	8
8 - 2 - 3 - 6 - 7 - 1 - 6 - 9	9
8 - 1 - 7 - 2 - 8 - 5 - 6 - 3	9

DF_____ + DR_____ = _____
Highest numbers circled

SUPERMARKET TEST

Directions

At the beginning of the test, point to the three rows (or shelves) of the supermarket so that the subject can see the grocery items in the three rows. Ask the subject to imagine that this is a real supermarket and to imagine walking around looking at all of the items in the three rows. The examiner then points to the item in the top left-hand corner as seen from the subject's side and asks the subject to name the item and to estimate its cost in a real supermarket.

Then tell the subject to name and price each of the items in the top row before going on to the row below, even if this means guessing some of the prices. Record the order in which each item is named and the price given for each.

When a subject is unable to recognize or name an item within 30 seconds of having priced the previous one, the examiner is to supply the name. A price estimate is still required for that item. Immediately after the last item has been named and priced, ask the subject to turn with his or her back to the grocery items and to recall as many of the items as possible. Allow a maximum of three minutes. During this period, the 16 items are to be randomly placed on a tray. As soon as the immediate recall test is finished, place the tray of items in front of the subject, who is then asked to replace all of the items in their original location.

Credit is given for each item replaced in its original row, regardless of where in the row it is placed, however, still note the exact location of each item. About 30 minutes later, ask the subject again to try to recall the names of the items.

SUPERMARKET TEST (continued)

Score Page

Price		Items Correctly Placed In Rows	
1.	9.	1.	9.
2.	10.	2.	10.
3.	11.	3.	11.
4.	12.	4.	12.
5.	13.	5.	13.
6.	14.	6.	14.
7.	15.	7.	15.
8.	16.	8.	16.

Immediate Recall (3 min.)		Delayed Recall (after 30 min.)	
1.	9.	1.	9.
2.	10.	2.	10.
3.	11.	3.	11.
4.	12.	4.	12.
5.	13.	5.	13.
6.	14.	6.	14.
7.	15.	7.	15.
8.	16.	8.	16.

Form A

Row 1	Row 2	Row 3
1. Eggs	7. Pancake Mix	12. Evaporated Milk
2. Tea	8. Lotion	13. Applesauce
3. Salt	9. Toothpaste	14. Crackers
4. Margerine	10. Flour	15. Canned Peaches
5. Chocholate	11. Olives	16. Vinegar
6. Jam		

Form B

Row 1	Row 2	Row 3
1. Laundry Soap	6. Parmesan Cheese	12. Canned Tuna
2. Toothbrush	7. Snickers Candybar	13. Jello
3. Cat Food	8. Cookies	14. Prunes
4. Canned Soup	9. Pork and Beans	15. Dishsoap
5. Macaroni and Cheese	10. Wax Paper	16. Canned Corn
	11. Ivory Soap	

Form C

Row 1	Row 2	Row 3
1. Sugar	6. Dental Floss	12. Milk
2. Greenbeans	7. Mustard	13. Dog Food
3. Rice	8. Creamcheese	14. Vitamins
4. Coffee	9. Light Bulbs	15. Cereal
5. Pens	10. Tape	16. Kleenex
	11. Orange Juice	

MEMORY QUESTIONNAIRE

Directions

Different people use their memory in different ways in their everyday lives. For example, some people make shopping lists, whereas others do not. Some people are good at remembering names, whereas others are not.

In this questionnaire, we would like you to tell us how you use your memory and how you feel about it. There are no right or wrong answers to these questions because people are different. Please take your time and answer each of these questions to the best of your ability.

Each question is followed by five choices. Draw a circle around the letter corresponding to your choice. Mark only one letter for each statement.

Some of the questions ask your opinion about memory-related statements; for example:

My memory will get worse as I get older.	a. agree strongly b. agree c. undecided d. disagree e. disagree strongly

---

In this example you could, of course, choose any one of the answers. If you disagree strongly you would circle letter e. The b and d answers indicate less strong agreement or disagreement. The letter c answer gives you a middle choice, but don't use the c unless you really can't decide on any of the other responses.

Some of the questions ask you often you do certain things that may be related to your memory. For example:

Do you make a list of things to be accomplished during the day?	a. never b. rarely c. sometimes d. often e. always

---

Again, you could choose any one of the answers. Choose the one that comes closest to what you usually do. Don't worry it the estimate is not exactly, or if there are some exceptions.

Keep these points in mind:

(a) Answer every question, even if it doesn't seem to apply to you very well.

(b) Answer as honestly as you can what is true for you. Please do not mark something because it seems like the 'right thing to say."

1. I get upset when I cannot remember something.
   a. agree strongly
   b. agree
   c. undecided
   d. disagree
   e. disagree strongly

2. I find it harder to remember things when I am upset.
   a. agree strongly
   b. agree
   c. undecided
   d. disagree
   e. disagree strongly

3. I can remember things as well as always.
   a. agree strongly
   b. agree
   c. undecided
   d. disagree
   e. disagree strongly

4. I get anxious when I am asked to remember something.
   a. agree strongly
   b. agree
   c. undecided
   d. disagree
   e. disagree strongly

5. I'm less efficient at remembering things now than I used to be.
   a. agree strongly
   b. agree
   c. undecided
   d. disagree
   e. disagree strongly

6. I have difficulty remembering things when I am anxious.
   a. agree strongly
   b. agree
   c. undecided
   d. disagree
   e. disagree strongly

7. The older I get the harder it is to remember clearly.
   a. agree strongly
   b. agree
   c. undecided
   d. disagree
   e. disagree strongly

8. I am just as good at remembering as I ever was.
   a. agree strongly
   b. agree
   c. undecided
   d. disagree
   e. disagree strongly

9. I am usually uneasy when I attempt a problem that requires me to use my memory.
   a. agree strongly
   b. agree
   c. undecided
   d. disagree
   e. disagree strongly

10. I feel jittery if I have to introduce someone I just met.
   a. agree strongly
   b. agree
   c. undecided
   d. disagree
   e. disagree strongly

11. I am much worse now at remembering the content of news articles and broadcasts than I was 10 years ago.
   a. agree strongly
   b. agree
   c. undecided
   d. disagree
   e. disagree strongly

12. Compared to 10 years ago, I am much worse at remembering titles of books, films, or plays.
   a. agree strongly
   b. agree
   c. undecided
   d. disagree
   e. disagree strongly

13. I remember my dreams much less now than 10 years ago.
   a. agree strongly
   b. agree
   c. undecided
   d. disagree
   e. disagree strongly

14. I can't expect to be good at remembering postal codes at my age.
   a. agree strongly
   b. agree
   c. undecided
   d. disagree
   e. disagree strongly

15. Most people find it easier to remember the names of people they especially dislike than people they hardly notice.
   a. agree strongly
   b. agree
   c. undecided
   d. disagree
   e. disagree strongly

16. I misplace things more frequently now than when I was younger.
   a. agree strongly
   b. agree
   c. undecided
   d. disagree
   e. disagree strongly

17. As people get older they tend to forget where they put things more frequently.
    a. agree strongly
    b. agree
    c. undecided
    d. disagree
    e. disagree strongly

18. Compared to 10 years ago, I now forget many more appointments.
    a. agree strongly
    b. agree
    c. undecided
    d. disagree
    e. disagree strongly

19. If I am put on the spot to remember names, I know I will have difficulty doing it.
    a. agree strongly
    b. agree
    c. undecided
    d. disagree
    e. disagree strongly

20. My memory for important events has improved over the last 10 years.
    a. agree strongly
    b. agree
    c. undecided
    d. disagree
    e. disagree strongly

21. I would feel on edge right now if I had to take a memory test or something similar.
    a. agree strongly
    b. agree
    c. undecided
    d. disagree
    e. disagree strongly

22. My memory for phone numbers will decline as I get older.
    a. agree strongly
    b. agree
    c. undecided
    d. disagree
    e. disagree strongly

23. My memory for dates has declined greatly in the last 10 years.
    a. agree strongly
    b. agree
    c. undecided
    d. disagree
    e. disagree strongly

24. My memory for names has declined greatly in the last 10 years.
    a. agree strongly
    b. agree
    c. undecided
    d. disagree
    e. disagree strongly

25. As long as I exercise my memory it will not decline.
    a. agree strongly
    b. agree
    c. undecided
    d. disagree
    e. disagree strongly

26. I know if I keep using my memory I will never lose it.
    a. agree strongly
    b. agree
    c. undecided
    d. disagree
    e. disagree strongly

27. When I am tense and uneasy at a social gather I cannot remember names very well.
    a. agree strongly
    b. agree
    c. undecided
    d. disagree
    e. disagree strongly

28. It's up to me to keep my remembering abilities from deteriorating.
    a. agree strongly
    b. agree
    c. undecided
    d. disagree
    e. disagree strongly

29. When someone I don't know very well asks me to remember something I get nervous.
    a. agree strongly
    b. agree
    c. undecided
    d. disagree
    e. disagree strongly

30. Even if I work on it, my memory ability will go downhill.
    a. agree strongly
    b. agree
    c. undecided
    d. disagree
    e. disagree strongly

31. I know of someone in my family whose memory improved significantly in old age.
    a. agree strongly
    b. agree
    c. undecided
    d. disagree
    e. disagree strongly

32. I get anxious when I have to do something I haven't done for a long time.
    a. agree strongly
    b. agree
    c. undecided
    d. disagree
    e. disagree strongly

33. My memory has improved greatly in the last 10 years.
    a. agree strongly
    b. agree
    c. undecided
    d. disagree
    e. disagree strongly

34. I get tense and anxious when I feel my memory is not as good as other peoples'.
    a. agree strongly
    b. agree
    c. undecided
    d. disagree
    e. disagree strongly

35. I do not get flustered when I am put on the spot to remember new things.
    a. agree strongly
    b. agree
    c. undecided
    d. disagree
    e. disagree strongly

36. My memory has declined greatly in the last 10 years.
    a. agree strongly
    b. agree
    c. undecided
    d. disagree
    e. disagree strongly

37. My memory will get better as I get older.
    a. agree strongly
    b. agree
    c. undecided
    d. disagree
    e. disagree strongly

38. I would feel very anxious if I visited a new place and had to remember how to find my way back.
    a. agree strongly
    b. agree
    c. undecided
    d. disagree
    e. disagree strongly

39. No matter how hard a person works on his memory, it cannot be improved very much.
    a. agree strongly
    b. agree
    c. undecided
    d. disagree
    e. disagree strongly

40. If I were to work on my memory I could improve it.
    a. agree strongly
    b. agree
    c. undecided
    d. disagree
    e. disagree strongly

41. I think a good memory comes mostly from working at it.

a. agree strongly
b. agree
c. undecided
d. disagree
e. disagree strongly

Code Number _____
Occasion _____
Date _____

MCI

This is a questionnaire about your memory. Please indicate the extent to which you agree or disagree with each statement. Provide the answer that is right for you by circling the number from 1 to 7 that best describes your beliefs. For example, if you **strongly agree** with the statement, you would circle the number **1**. If you **strongly disagree** with the statement, you would circle the number **7**. If you are **neutral**, you would circle the number **4**.

Sample statement: I love to play memory games.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

This person likes memory games quite a bit therefore he circled the number 2.

---

1. There's not much I can do to keep my memory from going downhill.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

2. Memory can be like a well-kept car: if people are careful to maintain it, it will run forever.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

3. Memory gets worse with age no matter how many people use it.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

4. As I get older, I can improve my memory by finding better ways to remember things.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

5. No matter how much I use my memory, it is bound to get worse as I get older.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

6. Alzheimer's disease is a common problem among the elderly.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

7. As I get old, I'll need to rely on others to help me remember things.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

8. If I work at it, I can improve my memory.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

9. If I use my memory a lot, it will stay in shape, just like my muscles do if I exercise.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

10. People need others to help them remember things as they get older.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

11. When I forget something I am apt to think I have Alzheimer's disease.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

12. Memory is like a patchwork quilt: parts of it can wear out while other parts remain unworn.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

13. There are things that people can do to better their memory.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

14. Memory loss is like a forest fire: it spreads rapidly.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

15. Memory is like a honeycomb: parts of it can fall apart, while other parts remain intact.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

16. Just as flowers wither over time, so will my memory regardless of what I try.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

17. Memory gets worse with age no matter what people do.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

18. I think there's a good chance that I will get Alzheimer's disease.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

19. People who use their memory often won't lose it.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

20. As I get older I won't have to rely on others to remember things.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

21. Memory is like a dam: once one part starts to go, so do the others.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

22. If people work to keep their memory up, they won't have to depend upon others to help them remember things.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

23. I sometimes think that I have Alzheimer's disease.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

24. When it comes to memory, there aren't any ways people can make up for the losses that come with age.

Strongly agree 1 2 3 4 5 6 7 Strongly disagree

Code Number _____
Occasion _____
Date _____

GOAL SCALE

Suppose that you have agreed to be part of a study about memory at the local university. You and the other participants are asked to imagine the following scene:

> "You have recently joined a new club, or organization that has 10 members. At the first meeting, you learn that you will be responsible for introducing each person in the club to another new member later that day."

The memory task for you and the other study participants is to match names and faces. You and the other study participants are shown a video of the 10 "club members", each of whom gives his or her name and makes a few statements about himself or herself. After a brief interval, you are shown a video segment of the face of each individual, and are asked to write down the name which corresponds to each face.

When people perform memory tasks like the one we just described, different thoughts and concerns enter their minds. Circle the number below each concern that corresponds to the answer that is true for you.

How concerned would you be with each of the following?

1. Making mistakes.

Not at all concerned 1 2 3 4 5 6 7 Very concerned

2. How well I do compared to others.

Not at all concerned 1 2 3 4 5 6 7 Very concerned

3. Getting a chance to talk about my mistakes, so I can figure out what I did wrong.

Not at all concerned 1 2 3 4 5 6 7 Very concerned

4. That my performance is up to par.

Not at all concerned	1	2	3	4	5	6	7 Very concerned

5. Looking like I have a good memory.

Not at all concerned	1	2	3	4	5	6	7 Very concerned

6. What I will learn from this.

Not at all concerned	1	2	3	4	5	6	7 Very concerned

7. That the memory task is challenging for me.

Not at all concerned	1	2	3	4	5	6	7 Very concerned

8. Being able to do it.

Not at all concerned	1	2	3	4	5	6	7 Very concerned

9. That this is something I'm good at.

Not at all concerned	1	2	3	4	5	6	7 Very concerned

10. That this will help me in my day-to-day life.

Not at all concerned	1	2	3	4	5	6	7 Very concerned

11. That it's new and different.

Not at all concerned	1	2	3	4	5	6	7 Very concerned

Now go back and read over the list of 11 concerns and decide which are your four top concerns.

Write a 1 next to the most important concern.
Write a 2 next to the second most important concern.
Write a 3 next to the third most important concern.
Write a 4 next to the fourth most important concern.

EMAS-S

Present Affect Reactions Questionnaire

Norman S. Endler, Ph.D., F.R.S.C., Jean M. Edwards, Ph.D.,
and Romeo Vitelli, Ph.D.

Name or Code No.: _____ Sex: M ___ F ___

Date: _____ Age: _____

Please circle a number from 1 to 5 for each of the 20 items to indicate:

"HOW YOU FEEL AT THIS PARTICULAR MOMENT"

	1	2	3	4	5
1. Hands feel moist	Not at all				Very much
2. Distrust myself	Not at all				Very much
3. Breating is irregular	Not at all				Very much
4. Unable to focus on ask	Not at all				Very much
5. Have tense feeling in stomach	Not at all				Very much
6. Heart beats faster	Not at all				Very much
7. Feel helpless	Not at all				Very much
8. Unable to concentrate	Not at all				Very much
9. Perspire	Not at all				Very much
10. Fear defeat	Not at all				Very much

	1	2	3	4	5
11. Mouth feels dry	Not at all				Very much
12. Self-preoccupied	Not at all				Very much
13. Feel uncertain	Not at all				Very much
14. Feel tense	Not at all				Very much
15. Feel inadequate	Not at all				Very much
16. Hands feel unsteady	Not at all				Very much
17. Feel flushed	Not at all				Very much
18. Feel self-conscious	Not at all				Very much
19. Feel incompetent	Not at all				Very much
20. Feel lump in throat	Not at all				Very much

M. D. CAPRIO-PREVETTE

14011 53 AVENUE

EDMONTON, ALBERTA

CANADA T6H 0S9

HOW I FEEL QUESTIONNAIRE

For each of the statements below, choose the best answer for how you felt over the past week (circle yes or no).

1. Are you basically satisfied with your life?.....yes no
2. Have you dropped many of your activities and interests?.....yes no
3. Do you feel that your life is empty?.....yes no
4. Do you often get bored?.....yes no
5. Are you hopeful about the future?.....yes no
6. Are you bothered by thoughts that you just cannot get out of your head?.....yes no
7. Are you good in spirits most of the time?.....yes no
8. Are you afraid that something bad is going to happen to you?.....yes no
9. Do you feel happy most of the time?.....yes no
10. Do you often feel helpless?.....yes no
11. Do you often get restless and fidgety?.....yes no
12. Do you prefer to stay home at night, rather than go out and do new things?.....yes no
13. Do you frequently worry about the future?.....yes no
14. Do you feel that you have more problems with memory than most?.....yes no
15. Do you think it is wonderful to be alive now?.....yes no
16. Do you often feel downhearted and blue?.....yes no
17. Do you feel pretty worthless the way you are now?.yes no
18. Do you worry a lot about the past?.....yes no
19. Do you find life very exciting?.....yes no
20. Is it hard for you to get started on new projects?.....yes no
21. Do you feel full of energy?.....yes no
22. Do you feel that your situation is hopeless?.....yes no
23. Do you think that most people are better off than you are?.....yes no
24. Do you frequently get upset over little things?...yes no
25. Do you frequently feel like crying?.....yes no
26. Do you have trouble concentrating?.....yes no
27. Do you enjoy getting up in the morning?.....yes no
28. Do you prefer to avoid social gatherings?.....yes no
29. Is it easy for you to make decisions?.....yes no
30. Is your mind as clear as it used to be?.....yes no

PREMATURE COGNITIVE COMMITMENTS

Directions

Write all replies verbatim. Allow the subject to qualify for him or herself what is meant by "elderly" or "older", and the degree of memory loss.

1. When you were in your 30's, did you know an elderly person with a memory difficulty?

2. Back then, what did you believe was the cause of their memory difficulty?

3. Now, what do you believe was the cause of their memory problem?

4. Back then, did you ever think it might happen to you?

5. Now, do you think it can happen to you?

6. When you were 20 years of age did you think your memory would decline as you got older?

   30 years?

   40 years?

   50 years?

   60 years?

   70 years?

7. Imagine you are 50 years old again, and you are able to look into the future to right now. Would you have expected your memory abilities to be as they are today? (Or better? Or worse?)

   60 years?

   70 years?

APPENDIX D

Informal Class Evaluation

EVALUATION

1) Does the memory class offer a good balance of theories and practical activities?

Yes____ No____ Somewhat____

Comment:_____

2) What is the most helpful part of the classes (lectures, group discussion, homework, group exercises, certain program activities, etc.)?

3) What are some of the things you want to change in this memory class (e.g., the format, size, content, facilitator, etc.)?

4) Does the class content meet your expectations?

5) Are there any topics you would like the memory class to elaborate on?

6) Is the homework useful?

7) Do you believe that the class has resulted in any changes in your memory?

8) Any additional comments:

APPENDIX E

Example of Cognitive Distortions

Related to Memory Function in Later Life

Example of Cognitive Distortions Related to Memory Function in Later Life

Overgeneralization

When an individual overgeneralizes, a single negative event is seen as a never-ending pattern of defeat. Words indicating that overgeneralizing is occurring include, 'all', 'never', and 'always'. For example, an older adult forgets the name of someone that he or she just met. An example of an overgeneralizing cognitive distortion would be, "I never remember people's names".

Awfulizing

Awfulizing is the tendency to exaggerate the negative aspects of a situation. Words that indicate that a subject is awfulizing include, 'terrible', 'awful', 'devastating', and 'catastrophic'. For example, an older adult is asked to speak at a luncheon for seniors, and the following thought crosses his or her mind, "They made a terrible mistake in asking me to speak at this event. I am sure that I will forget what I want to say".

Self-expectation

The cognitive distortion of self-expectation is the exaggerated criteria of performance placed on oneself, and is usually accompanied by such words as, 'have to', 'must', 'need to', 'can't', and 'should'. There is a tendency to compare oneself to an unrealistic view of others. For example, an older adult has just completed a memory enhancement course and believes that his or her memory has improved. Suddenly, however, the subject realizes that he or she forgot a doctor's appointment. The subject might feel disillusioned and despondent, and

thinks, "I'm not getting anywhere. I should be able to remember better".

Exaggerated Self Statements

This cognitive distortion entails that an older adult exaggerate one's own importance by placing him or herself in a category or under a demand that would be unrealistic for anyone else. For example the statement, "How could I have forgotten my dentist's appointment? I have the worst memory of anyone I know", masks the arrogance of the accompanying belief that, "I am one of a kind". Words that may cue an older adult to this cognitive distortion include, 'most', 'biggest', and 'worst'.

Mind Reading

Mind reading is a label which is applied to the tendency to attribute negative, internal states to others. The pronoun 'you' is targeted as the cue word in such statements and is followed by additional cue words as 'feel', 'think', and 'believe'. A mind reading statement is frequently completed with a comment that is self defeating. For example, a mind reading cognitive distortion might be, "You think that I'm too old to learn something new and do it well", or "You don't think I can remember when to take my medication".

Self-Criticism

This cognitive distortion is often applied in response to a mistake or unpredicted and negative outcome of behaviour. Words that cue a subject to this distortion are global self attributes which take the form of name calling, such as 'bad', 'stupid', and 'crazy'. For example, "I can't remember anything. I must be stupid".

APPENDIX F

Role-play Script

Role-play with Mrs. D.

INTERVIEWER: Have you recently experienced any changes in your memory?

MRS. D: Oh yes, you know all the expected changes that go with getting older. I can't seem to remember things like I used to.

INTERVIEWER: Which events are more difficult to remember: recent events or events from the remote past?

MRS. D: Recent events seem to be more difficult to remember. I remember most things from my past - songs, funny stories, and some things that I don't even want to remember. But I seem to forget what I did three days ago, or where I put my keys. I'm always looking for my keys! But that's just old age, I guess. As people get older they tend to forget where they put things more frequently. I can't be expected to remember everything at my age.

INTERVIEWER: I have a short paragraph that I am going to read to you. Listen carefully because when I am through I would like you to tell me everything that you can remember.

"Like giant boxcars, apartment buildings sit on the permafrost atop the world's largest producing natural gas field. This is still a vast Alaska-like frontier, where cities spring up overnight to support workers who tap the region's mineral deposits."

MRS. D: Oh dear! I'm supposed to remember that? I can't remember... something about apartment buildings near a natural gas field where the workers live. You don't expect me to remember more than that, do you? When I was younger I could have remembered most of it, but not now. That's just the way it goes. I can't remember things very well now. Sometimes I get upset when I can't remember something, like somebody's name. I get so angry with myself. It's even worse when I have to introduce someone I just met. I always forget their name. It's quite upsetting. But I just can't expect myself to have a good memory after all these years.

INTERVIEWER: I have another short paragraph that I am going to read to you. Again, tell me all that you remember. OK?

MRS. D: I'll try, but as you can see, it's hardly worth trying. I won't remember anyway.

INTERVIEWER: "Measuring their lives in minutes, passengers rush for trains at New York City's Grand Central Station. Despite our mastery of clocks and calendars, the nature of time itself remains a mystery."

MRS. D: Oh dear! I feel a bit embarrassed. I should be able to remember some of it. It's about the nature of time and people in New York City rushing against time for their train.

INTERVIEWER: How do you feel right now about these memory exercises?

MRS. D: To be perfectly honest, I feel a bit on edge right now. I get flustered when I am put on the spot to remember new things. When someone I don't know asks me to remember something I get nervous. Of course I know it's downhill from here, no matter how hard I work on my memory, it's still going to deteriorate with time. Why, it already has. There's nothing I can do about it. Sometimes I feel a bit depressed by it all.

Role-play With Mrs. M.

INTERVIEWER: Have you recently experienced any changes in your memory?

MRS. M: Oh yes, I can't seem to remember things like I used to.

INTERVIEWER: Which events are more difficult to remember: recent events or events from the remote past?

MRS. M: I seem to forget both recent and remote things, but it seems that I forget more recent occurrences. My daughter will say that she already told me something and then I'll ask her again. Honestly though, I think I always did that. I never considered myself to have a poor memory, but I know I get distracted - and I certainly was distracted when I raised my six children. When I put my mind to remember something and it is important to me, I can usually remember.

INTERVIEWER: I have a short paragraph that I am going to read to you. Listen carefully because when I am through I would like you to tell me everything that you can remember.

"Like giant boxcars, apartment buildings sit on the permafrost atop the world's largest producing natural gas field. This is still a vast Alaska-like frontier, where cities spring up overnight to support workers who tap the region's mineral deposits."

MRS. M: Something about apartment buildings near a natural gas field where the workers live. If you read it again I'll listen a bit more carefully. I wasn't really listening. That's what happens when I meet new people and I forget their names. I'm usually thinking about what they look like and what their situation is more than remembering their names. It's more interesting to me.

INTERVIEWER: I can't read that paragraph again, but I have another short paragraph that I am going to read to you. Again, listen carefully and tell me all that you remember. OK?

MRS. M: Oh good. I'll put a bit more effort into it this time.

INTERVIEWER: "Measuring their lives in minutes, passengers rush for trains at New York City's Grand Central Station. Despite our mastery of clocks and calendars, the nature of time itself remains a mystery."

MRS. M: It's about the nature of time and people in New York City rushing against time for their train. Oh yes! That's New York City's Grand Central Station... and although we have mastered the use of clocks and calendars, time is still a mystery to us.

INTERVIEWER: How do you feel right now about these memory exercises?

MRS. M: They are certainly a challenge. I feel as though I would like to do better on these exercises. It emphases to me how I can allow my memory to become lazy by not extending it. It's up to me to keep my memory abilities from deteriorating. Although I may be getting older, I believe that as long as I keep using and exercising my memory I will never lose it, or at least I hope I won't.

APPENDIX G

Example of

Learning-oriented and Performance-oriented Statements

Example of Learning-oriented and Performance-oriented Statements

Performance-oriented thinking:

- "What will they think when they realize that I forgot his name?"

- "I was never very good at remembering."

- "I have a poor memory."

- "I have a good memory." (Even though this may appear to be an adaptive comment, there are always people who will have a 'better' or 'worse' memory than oneself. In comparison to someone else an older adult's memory may or may not be 'good'. In either case, the subject is consumed with judging his or her memory ability, as opposed to thinking of ways to maintain and develop it.)

Below is an example of performance-oriented thinking occurring in a common everyday situation:

> A woman can't remember where she put her keys. She says to herself, "I have such a poor memory. I was never very good at remembering, so what's the use of trying"? The next day the woman happens to find her keys in her coat pocket.

Learning-oriented thinking:

- "What is the next step I can take to help me remember this?"

- "What did I do last time that helped me to remember this next step?"

- "What strategies do I now know that can help me to remember this?"

- If I don't remember now, what else can I do instead to get me closer to what I want to accomplish?"

Below is an example of learning-oriented thinking occurring in a common everyday situation:

> A woman can't remember where she put her keys. She says to herself, "What is the next step I can take to help me to remember where I put my keys? What did I do the last time that I misplaced my keys that helped me to remember?" After retracing her steps she finally finds them in her pocket.

APPENDIX H

An Example of Oral Point-counter Point Using Performance-oriented and Learning-oriented Statements

An Example of Oral Point-counter Point Using Performance-oriented and Learning-oriented Statements

Subjects are asked to write down as many performance-oriented statements with regard to memory as they can. The class is divided into pairs and they exchange lists with their partner.

Person A reads their partner's first performance-oriented statement. Person B then counters the performance-oriented statement with a learning-oriented statement. Subjects exchange lists after Person A has read through Person B's list of performance-oriented statements and Person B has counteracted them with a learning-oriented statement.

Performance-oriented	Learning-oriented
1) I can't remember all this information.	What is the next step I can take to help me to remember this information?
2) Just because I was able to remember it once, does not mean I will be able to do it again.	What did I do last time to help me to remember how to do it?
3) What's the use? I can't remember anyway.	If I don't remember now, what can I do instead to get me closer to what I want to accomplish?