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**Cognitive Retraining in the Elderly: The Role of
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Improvement Following Intervention**

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Michael William Collins

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COGNITIVE RETRAINING IN THE ELDERLY:
THE ROLE OF DEPRESSION ON
SUBJECTIVE AND OBJECTIVE IMPROVEMENT
FOLLOWING INTERVENTION

By

Michael William Collins

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ABSTRACT

COGNITIVE RETRAINING IN THE ELDERLY:
THE ROLE OF DEPRESSION ON
SUBJECTIVE AND OBJECTIVE IMPROVEMENT
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This study investigated the relationship between depression, imagery-based mnemonic and relaxation training, and objective and subjective memory. Participants (N = 88) for this study were healthy community dwelling elderly (Mean age = 67) who were offered periodic assessments of their mood and memory, in addition to a seven session workshop targeted to teach relaxation and cognitive mnemonic strategies for the relief of depression and/or memory difficulties. Level of depression symptoms were assessed with the Beck Depression Inventory (BDI), subjective memory complaints were measured with the Memory Assessment Clinic Self-Report Scale (MAC-S), and objective memory was assessed with the California Verbal Leaning Test (CVLT) and the Rivermead Behavioral Memory Test (RBMT). From our results, it appears that memory remains plastic even in older age. Our findings, similar to those of previous studies, revealed that group members significantly benefited in terms of objective memory following the training sessions. Significant mean differences were found from the pre-test to post-test session for the CVLT [$t(88) = 2.86$, $p < .05$] and the RBMT [$t(88) = 6.49$, $p < .05$]. Contrary to previous research in the area of subjective memory, our training efforts were also effective in

improving memory complaints from the pre-test to post-test session, as determined by the MAC-S [$t(88) = 4.13$, $p < .05$]. Furthermore, the improvement in subjective memory appeared to be related to a decrease in depression levels on the BDI over the course of the training sessions [$t(88) = -3.95$, $p < .05$]. Our study indicated that a multifactorial training approach can be equally valuable for different age groups within an elderly sample in terms of both objective and subjective memory improvement. However, results indicated that older individuals in the sample (those over the age of 75) benefited less in terms of objective memory if they evidenced even mild levels of depression symptomatology at the pre-test session. Suggestions for future research as well as implications of these findings were discussed.

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differentially vulnerable to the effects of aging, a disruption in the glucose metabolism in the aging brain, decreased processing resources in the elderly, and a reduced attentional capacity in the elderly (Craik, 1991). However, whatever the cause, the belief that cognitive and memory performance declines from young to older adulthood is generally well supported by experimental studies throughout the gerontological literature.

Additionally, with the fear of such insidious diseases as Alzheimer's disease and other progressive neurological illnesses, the integrity of one's memory looms large for the elderly. In fact, more than two thirds of persons over the age of 75 have expressed concerns about memory loss (Maloney & Bartz, 1982). It has even been suggested that memory loss is the single biggest threat to independent living in the elderly (Taver, 1984). It is therefore expected that great fear surrounds the issue of cognitive decline and memory loss in this population.

In recognition of this well-founded fear, much research has focused on the design and implementation of relatively brief interventions which may attenuate or even reverse cognitive decline and memory impairment. Although a host of interventions have been introduced in the literature, memory aids can be classified into two general categories; internal and external aids (Harris, 1980). Internal memory aids involve the internal manipulation of information and usually involve mnemonic training through the use of visual imagery. External memory aids are viewed as involving the external manipulation or information and include strategies such as writing reminders to oneself, making a shopping list, or asking others for needed information. Although training programs designed to improve memory performance in the elderly have been substantially variable,

programs have been consistent in teaching these internal and/or external memory strategies. Since a great amount of literature has been conducted in the design and implementation of these programs, it becomes important to first examine whether these interventions are successful in improving memory in the elderly.

Memory training programs begin with an effort to delineate the everyday memory concerns of older adults and to define strategies and tasks which may prove to be good methods for intervention. The typical format implemented to assess the effectiveness a training program usually consists of (a) a pre-test assessment on memory measures (e.g. serial recall, prose recall), (b) memory training using imagery based mnemonic strategies across multiple sessions, and (c) a post-test assessment on equivalent forms of the original memory tasks. Given the voluminous amount of research conducted in the area of geriatrics over the last two decades, it is of no surprise that cognitive and mnemonic training in the elderly has received a considerable amount of attention by researchers. In considering what should actually be trained, researchers have usually focused on tasks which appear to resemble some practical memory concern; that is, tasks which have face validity and are ecologically valid (West, 1989). Furthermore, successful interventions should be theory driven and provide training in areas which have been shown to be affected by age-related cognitive changes (e.g. working memory, explicit memory).

From the literature presented below, it will be shown that memory remains plastic even in older age. In general, researchers are in agreement that imagery based mnemonic training programs are successful in improving objective memory in the elderly population. Two programs in particular, the method of loci technique and the face-name mnemonic,

have been extensively studied and been shown to be effective methods of intervention. Furthermore, as shown below, there is evidence to suggest that the plasticity associated with mnemonic training appears to be largely specific to that training, with the largest treatment gains occurring in groups who are taught relaxation techniques and are trained to make deeper, more elaborate imagery associations at the time of encoding.

Although the literature will clearly show that older adults improve on objective memory measures following such training, there is no definitive evidence to suggest that older adults subjectively perceive these positive changes. As it will be outlined, no study to date has found a reliable positive effect of memory training on subjective memory appraisal as tapped by various metamemory questionnaires. With this finding, the utility of these programs can be called into question.

This study proposes to more closely investigate the objective and subjective changes following mnemonic intervention by looking at a more distal cognitive and psychological factor in training outcome, such as depression. Since depression is highly prevalent in the aging population, it becomes important and necessary to examine how this mood state affects mnemonic training intervention. The following literature review will assert that depression has a "shallowing" effect on information processing, learning, and memory; three processes which are vital in the teaching and understanding of imagery based mnemonics. Furthermore, outlined research will show that subjective memory complaints are more a diagnostic indicator for depression than they are for true objective memory impairment. Given such findings, it is intuitive to suggest that depression may have a direct affect on both objective and subjective memory following training.

Surprisingly, however, it will be shown that depression has been given little to no attention in explaining the effects of this training. This proposed study will closely investigate the role of depression on these processes and will hypothesize that those who are not depressed will benefit more in terms of objective memory than has been previously shown in the literature. Furthermore, it will be hypothesized that non-depressed elderly individuals will subjectively perceive these changes, endorsing fewer memory complaints after training is complete. If these hypotheses prove true, this investigation may provide important theoretical and practical considerations in the increasingly popular and important area of memory training in the elderly. Specifically, those who are depressed at the onset of training may be ill-advised to engage in the intervention since both objective and subjective memory improvement will be compromised as compared to those who are not depressed. Clinically speaking, it may be more effective to treat the depression first and then provide the mnemonic intervention, since those who have a "normal" mood state will have been shown to benefit more, both objectively and subjectively, from such a training approach. In addition, other training considerations may be applicable if increasing levels of depression symptomatology have an impact on training outcome. With these ideas in mind, what follows is a review of the literature providing background information in the area of mnemonic training, with a focus on the efficacy of the most widely used interventions.

It should be noted that the following literature was obtained through searches utilizing PsychINFO, PsychLIT, and MEDLINE Express, on-line services provided by the Michigan State University and the University of Michigan library systems.

Cognitive Retraining in the Elderly: The Method of Loci Technique

Smith (1980) has reported that the spontaneous use of organizational schemes, such as semantic clustering, to encode verbal information decreases with an increase in age. This encoding deficit directly affects memory since the ability to "chunk" or organize information becomes compromised. Therefore, a systematic intervention focusing on the organization of verbal material could prove useful for any elderly training program.

One such mnemonic used for this purpose is a list-learning strategy called the method of loci, which requires three general steps (Rose & Yesavage, 1983). First, the person generates an ordered list of locations from a familiar setting, such as one's residence or place of work. Once the locations are learned serially, the individual actively associates a visual image between the first item on the list to be remembered to the first location along the familiar path (i.e., home or work). Third, the individual proceeds in a serial order until all the list words are visually associated with different familiar items along the path. To recall the memory list, the individual simply takes a "mental walk" from each location to the next "stopping" along the way to first visualize the familiar location and then to retrieve the actual list item (Yesavage & Rose, 1983). In theory, this mnemonic provides the individual with an active strategy to organize and encode verbal information, thus countering age-related deficits which have been found in this area.

Kliegl, Smith, and Baltes (1989) trained both younger and older adults in the method of loci technique and examined the effects of the training on the ability to encode and retrieve ordered information. After 26 training sessions, results indicated that older and younger adults exhibited a large range of developmental reserve capacity and that

older adults were able to repeat, on average, 32 of 40 words that they had seen only once at a self-paced presentation rate. However, under timed conditions, older adults showed less training gain when recall occurred under highly speeded conditions. These researchers concluded that substantial memory plasticity was evident in both age groups.

Rose and Yesavage (1983) examined the effectiveness of the method of loci on training across young, middle-aged, and older adults. These researchers trained the three groups of individuals for three days on this technique and used tests of free recall as the criterion measure. Results of the study indicated that all three age groups demonstrated significant improvement after learning the mnemonic, however, it was found that both the overall level of recall and the amount of improvement displayed decreased with an increase in age. These researchers attributed this decrease in performance to the development of encoding and retrieval deficits with age. Nonetheless, Rose and Yesavage concluded that teaching the method of loci technique could potentially help older adults function better in everyday life and decrease the feelings of hopelessness associated with cognitive aging decline. Baltes (1992) supported these latter findings through a testing of the limits approach while also using the method of loci technique. In this study, he trained both older and younger adults by an additional 18 assessment and training sessions to explore whether older individuals were able to catch up with younger adults performance with additional mnemonic practice. Findings from this study suggested that older adults were able to significantly improve their objective memory performance, however, these individuals evidenced significant and robust performance deficits when compared with young adults. Baltes (1992) hypothesized that these findings may have been the result of a

loss in the production and use of mental imagination for operations of the mind as one grows older.

Yesavage and Rose (1984) examined the effectiveness of a variation in the method of loci technique for older adults. These researchers taught the standard method of loci technique to one group and the second group received identical instructions but were also taught to make a personal judgment of the pleasantness of each visual image association. Yesavage and Rose predicted that the latter group would benefit from more elaborate encoding of the visual stimuli, making the stimuli more accessible for later recall. As predicted, results indicated that the Method of Loci plus judgment group performed significantly better on a list learning task after three days of training. These researchers concluded that additional elaboration of visual image associations bolsters the overall effectiveness of the method of loci technique. This finding was also supported by Brooks (1993), who explored difficulties with the utilization of the method of loci technique. In his study, older subjects received 6 hours of imagery, judgment, and relaxation pretraining followed by mnemonic training for either 4 hours regular training or 6 hours extended training. The subjects were then asked to identify the problematic constituent steps of learning the technique. Results of the study found that both groups identified difficulty with abilities called upon in using the technique, but that additional pretraining efforts, especially in the form of imagery pretraining and forming a judgment of the imagery stimulus, bolstered the overall effectiveness of the mnemonic technique.

Finally, Anschutz, Camp, Markley, and Kramer (1985) employed the method of loci technique and examined whether older adults utilized the technique effectively in an

ecologically valid setting. These researchers trained older participants in the standard technique of the method of loci and then verbally presented them with a shopping list of 12 grocery items. The participants then utilized the method of loci to actually shop for groceries. Four weeks later, a second grocery shopping test was conducted. Results indicated that participants exhibited near perfect performance in the first grocery shopping task, however many of the subjects modified their strategies before the second shopping task. Anschutz et al. (1985) reported that those participants who did not modify their strategies were more likely to exhibit long-term benefits of the mnemonic training by remembering more grocery items. The researchers concluded that older adults were able to generalize the mnemonic to ecologically valid settings at optimal levels, and that using the mnemonic in its' unadulterated form provided the best results.

Cognitive Retraining in the Elderly: The Face-Name Mnemonic

It is well documented that older adults perform more poorly than young adults on tests of secondary or long-term memory (Craik, 1977). One practical implication of this finding is a reduced ability to remember names as one becomes older. In fact, data from a large memory complaint survey indicated that name forgetting was the most frequent of 18 potential memory complaints in the elderly (Zelinski, Gilewski, & Thompson, 1980). Therefore, an intervention aimed at bettering name recall could prove useful for an elderly cognitive training program.

Another imagery based mnemonic employed solely for this purpose was devised by McCarty (1980). As outlined by McCarty, this face-name mnemonic requires three

general steps; (a) identifying a prominent feature of the persons face (e.g., nose), (b) registering the person's name and deriving a concrete, high-imagery transformation of the name (e.g. Wagner becomes a wagon), and (c) associating the prominent facial feature with the imagery-based name transformation (e.g., visualizing a wagon traveling over the person's nose). After forming the visual image, one can recall the name at a later date by utilizing the following steps; (a) identifying the prominent facial feature, (b) using the feature to retrieve the visual image, (c) identifying the name transformation through the associated visual image, and (d) decoding the name from the name transformation. McCarty (1980) showed that a group of students who were trained to use this mnemonic and were provided the name transformations performed significantly better on a face-name test than a group trained in rote memorization techniques. Additional findings by McCarty revealed that all the component steps of the mnemonic were required for its' general effectiveness, and that the weakest link in the series of instructions was remembering the transformed name given the prominent facial feature.

Yesavage, Rose, and Bower (1983) examined the effectiveness of the face-name mnemonic on memory in aged adults. The study was comprised of three groups. The first group was taught the standard mnemonic technique as outlined by McCarty (1980). The second group received identical instructions with an additional instruction to judge the pleasantness of the image association. Participants in the third group were controls since they were not taught to form an image associating the prominent facial feature with the name transformation. Findings from the study indicated that those who were taught the standard mnemonic technique performed significantly better on a face-name test than the

controls. Furthermore, those who were asked to judge the pleasantness of the image remembered more names than the standard group and showed less forgetting on a measure of delayed recall. Yesavage, Rose, and Bower (1983) hypothesized that by making affective judgments of the stimulus, the image association of the name was kept in working memory for a longer period of time, thus enhancing recall.

Gratzinger (1990) used a design similar to the latter study in exploring the role of personality trait differences in improving face-name recall in older adults. In this study, three treatment conditions included the standard face-name mnemonic, but differed in the method of the nonmnemonic training (imagery, relaxation, and imagery and judgment). In addition, the interventions were assessed in conjunction with the NEO Personality Inventory. Findings of this study suggested that all subjects improved significantly from pre-test to post-test in the number of face-name pairs learned. Furthermore, subjects who scored higher on the openness factor on the NEO scored significantly higher on all face-name outcome measures, regardless of training condition. Gratzinger (1990) concluded that the face-name mnemonic was an effective memory strategy and that subtle personality factors may play a role in determining training outcome success following such an intervention.

Yesavage and Rose (1984) also looked at the effectiveness of the face-name mnemonic across different age groups. Young, middle-aged, and older adults were tested on face-name recall before and after a two-day program which trained individuals in the standard face-name mnemonic. Findings indicated that all three age groups showed significant improvement in recall following mnemonic instruction. Furthermore, no

significant differences in recall improvement were found between the age groups. The researchers concluded that the face-name mnemonic was an ecologically valuable technique which could prove useful in cognitive retraining programs for the elderly.

Cognitive Retraining in the Elderly: Relaxation and Memory Training

Reviews in the aging literature have noted various impairments in attention and concentration in the elderly (Kinsbourne, 1980). The general implication of Kinsbourne's work is that attention and concentration deficits have substantial importance in explaining memory and other cognitive deficits associated with an increase in age. Researchers have also noted that high levels of anxiety impair attention and concentration ability (Spiegal & Spiegal, 1978). Therefore, attempts have been made to reduce anxiety and thereby increase attention and concentration by teaching relaxation techniques to the elderly.

Lichstein (1988) described anxiety as an emotion consisting of three sources of distress; physiological, cognitive, and motoric. The aggregate influence of these sources of distress produce an unpleasant experience in the affected individual, resulting in tenseness, nervousness, and difficulties in concentration. Lichstein (1988) claimed that relaxation techniques, particularly progressive relaxation, unevenly affects the three sources of distress comprising anxiety. This researcher theorized that progressive relaxation affects the physiological response to anxiety and diverts attention away from troubling thoughts, so that secondary benefits are obtained in the area of memory and cognition. Therefore, in theory, relaxation training could prove to be an important adjunct in the cognitive retraining of the elderly.

Yesavage (1984) explored the effects of relaxation training in the elderly on the ability to make use of the face-name mnemonic on a face and name recall task. The experimental group received relaxation training prior to learning the mnemonic, whereas the control group was taught a nonspecific method on how to improve attitudes. Results indicated that the experimental group improved significantly more in face-name recall than controls. Furthermore, the improvement was significantly correlated with decreased state anxiety scores, as measured by an anxiety measure. As Yesavage stated, the results supported the use of relaxation training prior to learning a mnemonic strategy. Since controls actually became more anxious before the recall task, Yesavage concluded that learning mnemonics was a "stressful" experience for the elderly, and relaxation training buffered the associated stressors of learning the mnemonic and performing a recall task. Overall results of this study were consistent with Spiegal and Spiegal's (1978) finding that the ability to concentrate is inversely related to anxiety.

A study by Yesavage and Jacob (1984) also studied the effects of relaxation and mnemonic training on memory, attention, and anxiety in the elderly. These researchers hypothesized that relaxation training prior to mnemonic training would increase available memory processing capacity by objectively improving levels of attention. Using the same design as Yesavage (1984), but including measures of attention, anxiety, and cognitive interference, these researchers found that subjects who evidenced the greatest reduction in anxiety and cognitive interference and subsequent increase in attention also evidenced the greatest performance in recall on a face-name task. They concluded that anxiety in the elderly interferes with attention and memory through increased cognitive interference.

Furthermore, it was concluded that relaxation training was effective in reducing the amount of anxiety and subsequent interference by increasing attentional processes. They stated that including relaxation training as an adjunct to mnemonic training increased the efficacy of the cognitive retraining program.

Finally, a more recent study by Neely and Backman (1995), explored the effects of a multifactorial memory training program (method of loci, attention and concentration training, and relaxation training) on the recall of concrete words and the generalizability of gains across other recall tasks. A total of 46 healthy older adults participated and results suggested that multifactorial training gave rise to performance gains on the criterion task that was sustained for six months after the initial post-test. Although there was a restricted range of generalizability to other recall tasks (i.e., recall of objects, recall of abstract words), these researchers concluded that a multifactorial training approach was an effective mode of intervention for older adults. It should also be noted that pretraining scores alone predicted posttraining scores, whereas age, education, and level of global functioning did not contribute reliably to the magnitude of outcome gain.

Overall, the teaching of specific mnemonic strategies, such as the method of loci and the face-name mnemonic, appear to benefit memory performance in the elderly. Furthermore, the teaching of relaxation techniques prior to the training appears to potentiate the benefits of this training through the reduction of anxiety and the subsequent increase of attentional capacities. Additionally, researchers have found that concentration

training (Yesavage & Rose, 1983) and imagery pretraining (Yesavage, 1983) bolstered the effects of mnemonic training in the elderly.

Since objective evaluations of memory improve with mnemonic training, it becomes important to ask the question as to whether subjective evaluations of memory are similarly affected. Although intuition would suggest that improved performance outcome would result in an increased subjective appraisal of one's memory, previous research has indicated a discrepancy between objective and subjective evaluations of memory in the elderly (Taylor, Miller, & Tinklenburg, 1992). Furthermore, researchers are in general agreement that subjective memory complaints correlate more strongly with emotional states such as depression rather than an actual memory decline (Williams et al., 1987). To the extent that memory complaints reflect depressed mood, rather than actual deficits in functioning, are memory enhancement programs effective in increasing subjective memory appraisal in the elderly?

Cognitive Retraining in the Elderly: The Effects on Subjective Memory Complaint

Zarit, Cole, and Guider (1981) investigated the effects on mnemonic training on subjective memory complaints in the community dwelling elderly. Participants were randomly assigned to a memory training group which utilized visual imagery mnemonic techniques or a wait-list control group. All subjects were pretested for memory performance and memory complaints. Results of the training suggested that the experimental group benefited from training as they outperformed controls on recall tasks. Furthermore, subjective memory complaints decreased for experimental subjects and

increased for controls. However, results also indicated that subjective memory complaints were not significantly correlated with improvement in performance and that simply participating in the experimental group improved subjective memory complaints. Therefore, participation in either group significantly improved memory complaints and this improvement was independent of objective performance. These researchers concluded that expectations of improvement, rather than objective performance, was the important factor in decreasing subjective memory complaints.

In a similar research design, Scogin, Storandt, and Lott (1985) examined the effectiveness of a self-taught program of mnemonics for older adults complaining of memory difficulties. Again, results indicated that older adults benefited on objective measures of memory after the self-taught program. However, there were no significant changes in subjective memory complaint after training was complete. These researchers agreed with Zarit et al. (1981) in concluding that expectations about the aging process, and not objective performance, determined self-appraisal of memory. Specifically, Scogin et al. (1985) stated that individuals who complained about their memory were more concerned about the aging process and were sensitive to age-related changes with memory. Therefore, such individuals performed better on objective measures of memory after training but remained stable on subjective memory measures, since their expectations of cognitive decline remained unchanged.

These latter findings are consistent with a more recent study conducted by Best (1992), who investigated the effects of changing expectations about cognitive abilities on memory complaint and memory performance in older adults. In this study, participants

were assigned to one of four conditions; an expectancy change condition, a memory training condition, an art discussion control condition, and an evaluation control condition. Findings suggested that the memory training condition was significantly more effective in increasing memory performance scores, however, a trend in the data indicated that the expectancy change condition resulted in fewer memory complaints as compared to the memory training in isolation. Best (1992) concluded that memory training programs would benefit from the inclusion of expectancy change discussions along with mnemonic training intervention.

Hill, Sheikh, and Yesavage (1987) looked at the effects on mnemonic training on the relationship between recall performance and recall confidence. Participants were either trained in the face-name mnemonic over a two week period or were wait-listed as control subjects. Subjects were allowed to participate if there were no acute medical complications, no signs of organicity (a score of less than 27 on the Mini-Mental State Examination), and no signs of depressed mood (score of greater than five on the short-form of the Geriatric Depression Scale). As in previous studies, results suggested that training in the face-name mnemonic significantly improved face-name recall beyond that of controls. Furthermore, the researchers found that the relationship between performance ability and rated confidence was strengthened by memory training, although training had no direct effect on rated confidence. Hill, Sheikh, and Yesavage (1987) concluded that the accuracy of memory self-perceptions was facilitated with mnemonic training rather than overall level of confidence.

Verhagen, Van Ranst, and Marcoen (1993) also researched the effects of mnemonic training on self-perceptions of memory. These researchers reviewed seven different memory training programs, each of which consisted of training in imagery-based mnemonics. Although training across the seven programs was variable, overall results suggested that participants rated the programs as effective and being useful for their daily lives. Furthermore, 67% of the subjects rated that most of what they learned was useful and that the process of memory training was considered agreeable by almost all participants. The researchers found that 41% of the participants indicated that increased memory awareness was the main effect of the training. Although subjective evaluations clearly found that individuals perceived the memory program as beneficial, results from a metamemory questionnaire indicated that memory training did not change the way elderly perceive their memory functioning, nor did it change the usage of mnemonics. The sole exception was that after training, subjects reported significantly more instances of forgetting. Verhagen et al. (1993) concluded that the questionnaire used in the study, the Memory Functioning Questionnaire, did not tap the aspects of metamemory that change with memory training. They believed that cognitive changes were more subtle and had more to do with an increased feeling of control rather than the participant's self-perceptions of memory problems.

It is of note that the aforementioned studies found no significant effect of memory training on metamemory or the subjective appraisal of one's memory. This stability of memory complaint scores after memory training was also found in previous studies using

questionnaires other than the Memory Functioning Questionnaire (Looner & Richter, 1988; Rebok & Balcerak, 1989).

Specific mnemonic techniques, such as the method of loci and the face-name mnemonic appear to benefit objective memory performance in the elderly. Furthermore, the pre-administration of relaxation techniques, concentration training, and/or imagery training appear to augment the benefits of the mnemonics. Although intuition would suggest that improved performance outcome would result in an increased subjective appraisal of one's memory, results clearly show that the elderly's subjective appraisal of memory remains constant after mnemonic training. Therefore, although the elderly are objectively improving on memory measures, training does not appear to change the way the elderly perceive their memory functioning, especially if that training fails to address issues regarding expectancy about cognitive change in older age.

Although the effects of memory training on objective memory functioning has been examined extensively, the effects of memory training on subjective memory training has less often been the focus of research (Verhagen et al., 1993). Therefore, no clear understanding of this relationship exists. However, a considerable amount of research has been conducted in the associated area of subjective memory and cognitive decline. The question posed is this: If subjective memory appraisal is independent of objective improvement in memory, are subjective complaints congruent with a decline in memory functioning?

<u>Subjective Memory Complaint and Cognitive Decline: A Closer Look</u>

This topic has recently received a considerable amount of attention in the scientific press. Taylor, Miller, and Tinklenburg (1992) performed a longitudinal study in this area. Using self-report questionnaires and cognitive tests, these investigators found that at the individual level, memory performance did not significantly correlate with change in subjective self report. Larrabee and Levin (1986) also studied memory self-ratings and objective test performance in a normal elderly sample. These researchers found no association between memory complaint and objective measures of memory function. They concluded that subjective memory questionnaires should not be used alone in the diagnosis of age related disorders when the presenting complaint is memory loss. Kahn, Zarit, Hilbert, and Niederehe (1975) attempted to clarify the status of memory impairment in the elderly by assessing the relationship between subjective memory complaints and actual cognitive functioning and found a marked discrepancy between complaints and memory performance. They stated that complaints can occur with or without an actual deficit in memory, and that people who complained about memory sometimes performed better than those who did not.

Further evidence of this lack of a relationship between memory complaints and memory decline was given by Williams, Little, Scates, and Blockman (1987). Using a variety of clinical memory tests, they found that memory complaints were not significantly related to objective memory test performance. Derousene, Alperovitch, Arvay, and Migeon (1988) studied the interrelationship between severity of memory complaints, performance in memory tests, and affective status in 367 French 50-80 year olds. No

relationship was found between severity of memory complaints and age, sex, educational level, marital status, living alone or in family, or memory test performance.

Given the above research, one might feel comfortable in concluding that subjective memory complaints are not indicative of impaired memory functioning. However, one must be careful in interpreting studies that did not control for pre-morbid functioning. Christensen (1991) expanded on this point by examining the relationship between complaint and objective test performance in 20 elderly persons who identified themselves as having memory problems. Upon analysis, "memory performance proved poor in those memory complainers who: (a) considered their memory impairment to be both worse than their peers; and (b) had a discrepancy between their current level of memory functioning and that expected on the basis of premorbid intelligence" (p. 310). However, with this in mind, analysis of variance did fail to find a relationship between the report of failure of memory and objective test performance.

It is possible that the objective memory measures used in the above studies were not successful in delineating those individuals who performed at a much higher cognitive level in their earlier adult years and who experienced memory decline that landed above the cutoff scores for "memory impairment." However, the literature fails to report a significant relationship between memory complaint and poor memory performance. This consensus is not surprising since memory complaints are especially common in the elderly and since the incidence and prevalence of actual progressive memory disorders is relatively low. However, if complaints about memory do not reflect cognitive decline than what are the correlates of memory complaints and why do they occur?

The Ubiquitous Role of Depression in Subjective Memory Appraisal

The literature suggests that there is a marked incongruity between complaint about memory and actual memory performance. Complaints can occur with or without an actual deficit in memory. Perhaps these differences in performance between individuals are a result of other psychological processes, including depression. Although we have seen that the relationship between increased memory complaints and actual memory dysfunction was less than well established (see also, Lamberty & Bieliauskas, 1993), there was an observed relationship between depression and memory complaints.

In the Larrabee and Levin (1986) study mentioned above, factor analysis indicated that patients' memory self-ratings were primarily related to the affective state rather than to objective memory performance. These researchers measured depression using the Zung Depression scale. In the Kahn et al. (1975) examination, it was found that while performance varied with altered brain function, complaint was related to level of depression, as measured by the Hamilton Rating Scale for Depression. Kahn et al. concluded that complaints were found to be only a manifestation of depression, not of cognitive performance. In the Williams et al. (1987) research, memory complaints had a stronger association with depressed mood, as measured by the Beck Depression Inventory (BDI), than with performance on memory tests. In the Derousene et al. (1988) study, a strong correlation was found between severity of memory complaints and scores on a self-reporting depression questionnaire, even among those with low depression scores.

Since a clinical lore has developed that emphasizes subjective memory complaints as a diagnostic indicator for depression, it would make sense that subjective memory

complaints should decrease as depression lifts. Plotkin, Mintz, and Jarvik (1985) found

that improvements on the Hamilton Depression Scale were significantly related to a

decrease in subjective memory complaints, regardless of whether tricyclic antidepressant

or psychotherapeutic interventions were used.

Overall, researchers are in general agreement that memory complaints are

exacerbated in those who are depressed. In addition, a discrepancy exists between

objective memory and subjective evaluations of memory. It appears that subjective

memory complaints are more a diagnostic sign for depression than an indicator of actual

memory dysfunction. Therefore, could depression play a similar role in the relationship

between objective memory enhancement and inconsistent subjective memory appraisal?

Researchers are in general agreement that memory complaints are exacerbated by even

low levels of depression (Molinari, 1991). Therefore, it is necessary to closely examine

the role of depression on objective and subjective memory during cognitive training. If

depression is a crucial moderator variable between cognitive decline and subjective

memory complaint than it may be as crucial in looking at the relationship between memory

enhancement and subject memory appraisal.

Depression in the Elderly

The general assumption in both the popular and scientific press is that aging is

associated with an increased risk of depression. For example, as Klerman (1983) stated,

"Mental illness, in general, appears to be more prevalent among the elderly than among

younger adults; but the incidence of depression is particularly high in persons 65 and older- not only for depressive disorders, but also for transient symptoms of depression" (p. 3). Others do not fully agree with this view. As Newmann (1989) stated, empirical studies that have investigated the relationship between aging and depression do not show consistent support for this assumption. Epidemiological data about the incidence and prevalence of mood disorders in the elderly do not yield a complete and consistent picture (Blazer, 1983). Newmann's review attributed this inconsistency to diverse measurement approaches and flaws in design and analysis which make it difficult to draw clear conclusions regarding the relationship between depression and aging. Nonetheless, "depression is among the most prevalent health problems of the elderly, occurring for the first time in about 10 to 20 percent of the population 60 years or older" (p. 87) (Ruegg, Swerdlow, & Zisook, 1988). The occurrence of depressive symptoms seems to be high in the elderly ranging from 5 to 40 percent (Lamberty & Bieliauskas, 1993). Although traditional views regard depression as having a good prognosis in the general population, a prospective study of 124 elderly patients showed that only one-third actually had a good outcome (Murphy, 1983). This study suggested that poor outcome is most clearly associated with severity of depression, physical health problems, and strenuous life events such as bereavement and separation. Therefore, as Ruegg et al. (1988) stated, it is critical that clinicians appreciate the importance of depression in the elderly and be fully aware of the diagnostic indicators and the standard course of pathogenesis. Elderly individuals often have much to be sad about, as people around them become sick and die, social and

economic limitations often arise, health may be compromised, and commonly prescribed medications are often associated with sadness and fatigue.

As Lamberty and Bieliauskas (1993) pointed out, depression in the elderly is different from the classical depressions which occur in younger individuals. According to the Beck (1974) model of depression, the basic syndrome of depression is classically described by a cluster of five symptoms: (a) a specific alteration in mood, sadness, loneliness, or apathy; (b) a negative self-concept associated with self reproaches and self-blame; (c) regressive and self-punitive wishes; desires to escape, hide, or die; (d) vegetative changes; anorexia, insomnia, loss of libido; and (e) change in activity level; retardation or agitation. Lamberty and Bieliauskas (1993) stated that these symptoms may be inherent in the aging process and that "they are easily confounded by the effects of age and illness states common to the elderly as well as of changes due to physiological aging" (p. 151).

The Effects of Depression on Cognitive Performance in the Elderly

Considering the prevalence of depression in the elderly, it becomes important to assess the impact of this mood state on cognitive and memory processes within this population. Fortunately, a considerable amount of research has been conducted within this area. For example, a meta-analysis conducted by Hunter and Schmidt (1990) assessed the impact of depressed mood on memory across nine studies from which 13 effect sizes were calculated. Point bi-serial correlations across each of these studies indicated that a negative relationship (r -avg = -.360) existed between depressed group and explicit

memory ability. Hunter and Schmidt warned that this relationship was potentially spurious since the nine reported studies did not address the issue of causality within this relationship. However, these authors concluded that greater memory ability was associated with healthy groups of older adults while the depressed groups had relatively poorer explicit memory.

A comprehensive review of the literature conducted by Lamberty and Bieliauskas (1993) also suggested "small" differences between depressed older adults and normal patients in the area of cognition. Specifically, a summary of neuropsychological findings suggested that differences existed in favor of nondepressed patients for motor-related tasks and measures of attention. In the area of new learning ability, depressed patients evidenced mild attentional difficulty, "shallow" encoding of information, decreased response latency, and adequate encoding of information with serial presentation of material. In the area of memory retention, these researchers summarized existing literature by stating that depressed patients showed a near normal rate of forgetting on delayed recall testing, with recall not significantly different from that of non-depressed patients. Finally, in the area of language function depressed patients evidenced reduced verbal fluency.

Relative to the effects of depression on cognitive ability, the main areas of concern for mnemonic training exist in information processing, learning, and memory. Weingartner et al. (1981) directly studied depression-related changes in information processing in older adults. By contrasting the cognitive-memorial performance of depressed patients with that of normal controls, these researchers found that depressed

patients failed to engage in encoding strategies that would maximize the likelihood of subsequent recall. The researchers concluded that during depressive episodes, older adults evidenced both qualitative and quantitative changes in how information was processed. Specifically, events became less memorable since depressed patients appeared to use incomplete encoding strategies to organize the learned information. More importantly however, findings suggested that depressed patients were able to benefit and learn when material was presented in an already organized fashion. In a follow-up study, Weingartner (1986) examined depressed patients' encoding abilities as a function of the amount of effort required during the learning task. Findings of this study suggested that depressed patients were equal to normals when the learning task involved "minimal effort." However, when the learning task was "effort demanding," depressed patients performed significantly poorer than normal controls. As a result of these findings, Weingartner suggested that "biological systems associated with motivation, effort, and arousal ...appear to be linked to the performance of effort-demanding cognitive operations in depressed patients" (p.223). As Lamberty and Bieliauskas (1993) stated, findings across other similar studies have been fairly consistent in their findings. Therefore, in summary, as learning tasks become more difficult and "effort demanding", depressed patients evidence a reduced ability to effectively encode and process learned information that would maximize the likelihood of subsequent recall.

As Yesavage (1985) noted, mnemonic training is a demanding task since older adults find it especially difficult to produce and remember visual images and visual imagery associations. Furthermore, Yesavage, Sheikh, Friedman, and Tanke (1990) stated that

with mnemonic training there was substantial variability in response to treatment since elderly subjects evidenced difficulty in applying mnemonic strategies. In short, researchers are in general agreement that mnemonic training, with or without auxiliary training in relaxation and/or visual imagery, is a demanding process which requires "considerable" cognitive effort and mental awareness. In light of the finding that older depressed individuals evidence encoding difficulties in "effort demanding" tasks, it is intuitive to suggest that level of depression may be a predictor of mnemonic training success.

Since depression is "inherent" in the aging process and is highly prevalent in those over the age of 65 it becomes necessary to closely examine how this mood state affects both objective and subjective memory during cognitive training in the elderly. In reviewing the literature on mnemonic training in the elderly, it is clear that depression has not been given enough attention in explaining the effects of this training.

For instance, in those studies previously reviewed which examined the effects of the method of loci on objective memory performance (Kliegl, Smith, & Baltes, 1989; Rose & Yesavage, 1983; and Yesavage & Rose, 1984), depression was not a measured variable and therefore not considered in the analysis of the data. Similarly, in those studies which examined the effects of the face-name mnemonic on recall (McCarty, 1980; Yesavage & Rose, 1983; and Yesavage, Rose, & Bower, 1983) measurement of depression was not considered as a moderating variable. In looking at the effects of relaxation training on the effectiveness of mnemonics in the elderly, both Yesavage's (1984) study and Yesavage and Jocob's (1984) study screened for depression before selecting participants. Those with scores of greater than 12 on the Geriatric Depression Scale were excluded from both

studies. Therefore, the effects of depression on recall performance was not examined. Similarly, Yesavage's study on imagery pretraining and memory training (1983) and Yesavage and Rose's (1983) study on concentration training and mnemonic training used similar exclusionary criteria for depression in selecting their participants. Therefore, in these studies depression was either controlled for or not a considered a factor in the performance outcome. In short, the above findings of memory improvement after mnemonic and relaxation training can only be generalized to a nondepressed group of elderly.

In looking at the effects of mnemonic training on subjective memory appraisal, researchers have generally concluded that depression is not a moderating variable in the cognitive training-subjective memory relationship (or lack thereof). In the Scogin, Storandt, and Lott (1985) study, the researchers concluded that memory performance improved with mnemonic training but the training had no effect on subjective memory complaint or on depression levels. Level of depression was measured using the Zung Self-Rating Depression scale and results suggested that depression levels and subjective memory remained stable from pre to post test in both the high and low memory complaint group. It was concluded that training had no effect on depression or on subjective memory complaint. They concluded that complaints about memory did not reflect depression because neither the high complaint group nor the low complaint group were clinically depressed. In the Zarit, Cole, and Guider (1981) study mnemonic training again resulted in improved objective memory performance. Furthermore, improvements in subjective memory occurred but this improvement was independent of the type of training

administered since both the control group (current events discussion) and experimental group improved subjectively. Therefore, participation in a group was sufficient to reduce subjective complaints but it was "not clear" that the mnemonic training resulted in the subjective improvements. In this study, it was interesting to note that depression did have a minimal, but significant relation to subjective complaints of memory. However, since the improvement in subjective memory was not specifically attributed to the mnemonic training, this finding was not discussed.

In the Verhaeghen, Van Ranst, and Marcoen (1993) review it was found that participants regarded mnemonic training as an agreeable experience that was relevant to their daily lives. However, in the seven studies reviewed there was no measurable effect of mnemonic training on the Memory Functioning Questionnaire, a measure which assessed subjective memory complaint. The only significant finding was that individuals reported an increase in forgetting after the mnemonic training. Again, it is interesting to note that depression was not a measured variable in all of the seven studies reviewed. These authors attributed the stability of the metamemory scores to the lack of sensitivity on the metamemory questionnaire, suggesting that subjective changes are more subtle and may have more to do with feelings of control than with the perception of memory problems.

The present study proposes to investigate the relationship between depression, imagery-based mnemonic and relaxation training, objective memory, and subjective memory in greater detail. The literature reviewed has suggested that mnemonic training

programs improve objective memory performance in the elderly. However, similar programs have been shown to have little effect on subjective memory appraisal.

In taking a closer look at studies conducted in the area of mnemonic training and objective memory performance, it was found that depression was either not considered as an outcome variable or controlled for when selecting participants. Therefore, the generalizability of work done in this area is limited since depression is highly prevalent within the elderly population. Furthermore, it is possible that elderly individuals who are depressed have a reduced capacity to benefit from mnemonic training since the aging literature clearly suggests that depressed mood has a compromising affect on the encoding processes of older adults in "effort demanding" tasks (Weingartner, 1986).

Verhaeghen, Marcoen, and Goossens (1992) recently conducted a meta analysis in the area of improving memory performance in the aged through mnemonic training. In this study, a total of 33 studies were reviewed. Using treatment gain as the criterion measure, these researchers found that visually-based mnemonic training in the elderly enhanced performance reliably more than either re-testing or placebo treatment. Furthermore, results of the meta-analysis indicated that treatment gains were largest when subjects were younger, when pretraining was provided, when sessions were relatively short (<1.5 hrs.), and when training was provided in groups. Overall, Verhaeghen et al. (1992) examined 13 variables which could have influenced pre-to-post treatment gains. However, level of depression was not included in this list of predictor variables. Therefore, the effects of depression on objective memory improvement after mnemonic training is unknown at the present time. It is possible that a more distal factor, such as

mood state, has a direct affect on the ability to benefit from mnemonic training. More specifically, depression may be responsible for problems in the acquisition, retrieval, or application of the mnemonic training. Considering the prevalence of depression in the elderly and the generally accepted finding that depression directly affects encoding, it is clear that the affects of depression on mnemonic training outcome needs to be closely examined.

Furthermore, improvement in subjective memory should become an important focus for memory training programs. From the literature reviewed, it is clear that mnemonic training enhances objective memory in the aged. However, no study to date has found a reliable positive effect of memory training on subjective memory as tapped by various metamemory questionnaires. With this finding, the question of whether the effects of mnemonic training are of sufficient magnitude to warrant the training effort can be raised. If the elderly do not subjectively perceive positive changes in their memory after training in mnemonics, of what utility are the measurable changes in objective memory?

From the literature presented, it is clear that a relationship exists between subjective memory complaint and depression. However, a paucity of research exists looking at the role of depression on subjective memory enhancement. Since mnemonic training provides interventions specific to memory and not to depression, those with higher levels of depression may not feel as though they benefited from the training. Conversely, participants with lower levels of depression may feel the training was directly applicable to their memory concerns which would result in a more favorable subjective

appraisal. The present study is designed to document whether such an interaction exists, and to examine the role of depression on subjective memory after mnemonic training. As Verhaeghen et al. (1992) noted from the findings of his meta-analysis, "nothing can be inferred about the impact of mnemonic training on everyday memory performance or on metamemory" (p.250). In considering depression as a potential moderator of this relationship, this study will take an additional step in addressing these concerns.

As reported by Yesavage (1985), most of the studies in the area of improving memory via mnemonic training show wide variability of training results between individuals. However, little is known about the predictors of response to training. In light of the preceding discussion, the purpose of this study is to assess whether measurable levels of depressed mood negatively affect the impact of mnemonic and relaxation training on both objective and subjective memory.

<u>Hypotheses</u>

Based on the findings described in this summary, the following hypotheses are proposed:

1. Group members who receive mnemonic and relaxation training will improve significantly on objective measures of memory. Operationally, this will be tested by assessing the difference between pre-test and post-test performance on two objective memory measures assessing total recall. The memory measures employed will be the California Verbal Learning Test (CVLT) and the Rivermead Behavioral Memory Test (RBMT).

2. As levels of depression increase in group members at pre-test, objective memory benefits associated with mnemonic and relaxation training will significantly decrease from pre-test to post test. Operationally, this will be tested by measuring depression at pre-test with scores on the Beck Depression Inventory (BDI) and total memory recall at the pre and post test sessions with the CVLT and RBMT. Following Beck's (1987) interpretive guidelines for the Beck Depression Inventory (BDI), three depression groups will be delineated. Participants in the normal depression range will be those who score between 0 and 9 on the BDI at pre-test. Participants who score between 10 and 19 will be classified as moderately depressed. Finally, those who score 20 and above on the BDI will be classified as severely depressed.

3. A significant positive relationship will exist between subjective memory complaint and depression. Operationally, this will be tested by assessing the relationship

between a subjective memory measure, the Memory Assessment Self-Report Scale (MAC-S) and the BDI.

4. Group members receiving mnemonic and relaxation training with normal levels of depressive symptomatology measured at pre-test will improve significantly from pre-test to post-test on a subjective measure of memory. Operationally, this will be tested by measuring depression at pre-test with scores on the BDI and measuring subjective memory at pre-test and post-test with the MAC-S. Again, following Beck's interpretive guidelines for the Beck Depression Inventory (1987), participants in the normal depression range will be those who score between 0 and 9 on the BDI at pre-test.

5. Cohort related differences in improvement will be found in total memory recall following mnemonic and relaxation training. A young/old age group will be defined as those under the age of 65, a moderate/old age group will be defined as those between the ages of 66-75, whereas an old/old age group will be defined as those over the age of 75. It is hypothesized that the young/old age group will significantly outperform the moderate/old and old/old age groups. Total memory recall will be measured using the CVLT and the RBMT. In addition, a separate analysis will be done with age treated as a continuous variable. It is hypothesized that a significant negative relationship will exist between age and objective memory improvement from pre-test to post-test. The differences between the two analyses will be discussed.

6. Old/old age group members who are in the normal range for depression will benefit significantly more on objective memory measures following mnemonic and relaxation training than will young/old and moderate/old age group members who are in

the severe range of depression. Total memory will be measured with the CVLT and the RBMT. Using the criteria delineated by Beck (1987), normal depression will be defined as scoring between 0 and 9 on the BDI at pre-test and severe depression will be defined as scoring above 20 on the BDI at pre-test. Again, a separate analysis will be completed with age treated as a continuous variable rather than as three distinct groups. Within each depression group, we will look at the relationship between age and memory improvement. It is hypothesized that age and memory improvement will correlate more significantly in the normal depression group than in the severe depression group. Any differences in the analyses will be discussed.

METHOD

Participants

The participants (n=88) for this study were selected from an ongoing Michigan

State University (MSU) Psychological Clinic Aging Research Project. They were a subset

of community dwelling elderly recruited to volunteer by advertisement through senior

citizen groups, senior nutrition sites, and mid-Michigan retiree groups. Each individual

was offered two assessments of their mood and memory, as well as a seven-session

workshop targeted to teach relaxation and cognitive strategies for the relief of depression

and/or memory difficulties. This pool contained protocols of 55 women and 33 men,

ranging from 47-89 years old ($\underline{M} = 67.2$; $\underline{SD} = 8.8$), with a mean education of 14.8 years

($\underline{SD} = 2.9$).

Measures

1. Beck Depression Inventory (BDI)

The BDI is a self-rating instrument which measures depression. It consists of 21

items with four graded statements relating to the severity of the symptom. Recent

literature (Karanci, 1988) indicated that the BDI taps affective, motivational, cognitive,

and somatic symptomatology of depression. Karanci stated that although the BDI total

score has shown good sensitivity and specificity in detecting depression in medical

patients, several researchers have objected to using total BDI scores for medical patients. Karanci noted that the somatic/vegetative symptomatology tapped by the BDI may be by-products of the physical illness. Karanci's study of patterns of depression in medical patients, found that the somatic/vegetative symptomatology of depression can be partially accounted for by greater age, illness severity, and attributions to nonpsychological causes.

A cutting score between 14 and 15 points was recommended to identify the presence of significantly depressed mood by Beck and Beamesderfer (1974). Later, Beck (1987) recommended using scores on the BDI to delineate ranges of depressive symptomatology. Specifically, established interpretive guidelines suggested that scores ranging from 0-9 were in the normal range of functioning, scores ranging from 10-19 resulted in minimal to mild levels of depression, and scores of 20 and above resulted in moderate to severe levels of depression.

Results of studies suggested that the BDI has respectable internal consistency and stability for use with the elderly. For example, there was a positive relationship between conventional cut off scores on the BDI and selected diagnostic classifications of the Research Diagnostic Criteria (Spitzer, Endicott, & Robins, 1978) for detection of major and minor depressive disorders. Only 16.7% were misclassified by customary BDI cutoff scores (Gallagher, Nies, & Thompson, 1983). Furthermore, the concurrent validity of the BDI, when correlated with another depression measure, the Geriatric Depression Scale, was .85 with elderly medical outpatients (Norris, Gallagher, Wilson, & Winograd, 1987). These results suggested that the BDI can be used as a screening instrument for the identification of clinically depressed elders.

2. Memory Assessment Clinic Self-Report Scale (MAC-S)

The MAC-S is a relatively new scale which assesses the subjective domain of memory complaints. This revised questionnaire contains 21 ability items and 24 frequency of occurrence items. Example of factors include remote personal memory, numeric recall, word recall/semantic memory, attention and concentration, facial recognition, etc. Factor analysis demonstrated the usefulness of the MAC-S factors in a sample of 1106 participants. It has a large normative base that covers the adult range of 18-92 years. Data has been provided showing the concurrent validity of this new self-report scale. Results suggested significant associations between self-rated and objectively measured memory. Overall, the percentage of shared variance between the MAC-S and computer simulated objective memory tasks ranged from 27.0% to 29.4% (Larrabee et al., 1991).

Youngjohn, Larrabee, and Crook (1992) examined the test-retest reliabilities and practice effect magnitudes of the MAC-S battery and five traditional neuropsychological tests among 115 persons and reported significant practice effects at reevaluation. The test-retest reliabilities were equal to the other traditional neuropsychological measures but the traditional measures were superior in measures of attention and concentration.

3. California Verbal Learning Test (CVLT)

The CVLT is a test of verbal learning and memory. Participants are presented with a 16 item grocery list five times. This list is comprised of four items representing four different categories; tools, spices and herbs, clothing items, and fruits. The task measures the immediate, short delay, cued recall, long delay, and free recall of the

presented information. In addition, general learning abilities and learning strategies can be

assessed using this instrument. For the purposes of this study, we are primarily interested

in the number of words learned during the immediate and short delay acquisition period.

Delis, Kramer, Freedland, and Kaplan (1988) conducted a factor analysis of CVLT

scores utilizing normal subjects. Results indicated a six-factor solution; including,

acquisition rate, general verbal learning, learning strategy, response discrimination,

proactive effect, percent primary, and recall recency. These researchers also conducted an

analysis of the normative sample and cited a coefficient alpha of .74, a split-half reliability

of .63, and test-retest reliability of .59.

4. Rivermead Behavioral Memory Test (RBMT)

The RBMT is a brief (20 minute) test of everyday memory problems. Wilson,

Cockburn, Baddeley, and Hiorns (1985) reported that the test was designed to have good

face validity, monitor memory change over time, and tap ecologically valid memory

problems. As these researchers reported, the test is a bridge between laboratory-based

measures of memory and assessments obtained by questionnaire and observation. Twelve

components comprise the test, including tasks such as remembering an appointment,

picture recognition, remembering a new route, remembering a newspaper article

(immediate and delayed conditions), facial recognition etc. These tasks were selected on

the basis of observations made by these clinicians on brain injured patients and memory

difficulties reported in a study of head injured people (Sunderland, Watts, Baddeley, &

Harris, 1986).

Wilson, Cockburn, Baddeley, and Hiorns (1988) assessed the validity of the RBMT by correlating scores to performance on existing tests, to subjective ratings from patients, and to observations by therapists of memory lapses. Results indicated that patients evidenced substantially lower scores than controls, that the RBMT can broadly be regarded as measuring overall memory performance when assessed in terms of existing tests, and that subjective ratings correlated strongly with RBMT scores. Overall, these researchers concluded that the RBMT was a valid test of memory and provided a good estimate of the likelihood that a patient would encounter everyday memory problems.

Furthermore, interrater reliability was established by having 40 subjects scored separately but simultaneously by two raters. Results indicated a 100% agreement between the raters for both scoring procedures (Wilson et al., 1989). Finally, parallel form reliability was also established by these researchers by giving two versions of the test to 118 patients. The correlation between the two scores was .78 for the Screening Score, and .85 for the Profile Score. The authors concluded that the RBMT was a reliable test of everyday memory problems.

Procedure

Participants were assessed on the depression measure and both memory measures on a pre-training and post-training occasion at approximately a three month interval. These tests were administered as part of a larger study designed to assess mood and memory functioning. All testing was carried out by previously trained evaluators enrolled in MSU's clinical psychology programs. Participants were not paid for their participation.

However, each individual was told they would be receiving feedback on their mood and memory status, as well as receiving the seven session workshops targeting at improving memory difficulties. Each testing session required between one-and-one-half and two hours. All tests were initially scored by the battery's administrator. However, the tests were re-scored by an additional evaluator to ensure accuracy.

A session by session (7 sessions total) training manual directed the memory and relaxation training. Again, clinicians enrolled in MSU's clinical psychology program directed the training programs. Consistent with the findings by Verheaghen, Marcoen, and Goossens (1992), memory training was conducted in groups of 4-9 individuals over the age of 55 with each session lasting for approximately one hour.

Sessions one and two began with an educational instruction and a discussion of memory loss and its association to aging. The remainder of the sessions were devoted to teaching the method of loci technique, face-name mnemonic, relaxation training, attention and concentration training, and other age-related memory strategies. In addition, group members were provided with educational handouts discussing topics such as memory awareness and self-evaluation, age-related memory decline, memory and self-concept, self-change skills, pleasant activities and depression, positive thinking, assertiveness, and maintaining your memory power (See Appendix A). Each participant received written instructions on the method and techniques of the method of loci, face-name mnemonic, and relaxation training. The method of loci training also included four sets of commonly used words to be learned by the subjects. The reinforcement for the groups entailed the repetition of tasks, positive feedback, and homework on the application of the mnemonics.

As part of a larger study assessing mood and memory, half of the participants were taught standard mnemonic techniques, while half were trained with everyday applications. For example, the standard group were taught strategies for learning arbitrary word lists, while the everyday group were taught strategies for shopping items and errands. Both groups received the same amount of mnemonic training using the same learning techniques and strategies. Furthermore, both groups received the same educational handouts delineating the mnemonic techniques and addressing age-related concerns.

RESULTS

Data analyses were subdivided into three components. First, statistical

comparisons were made between the "everyday" memory group and "lab" memory group

to determine whether one group out-performed the other in terms of objective memory

improvement, subjective memory improvement, and level of depression following the

training sessions. Second, the six hypotheses were evaluated. Third, post-hoc analyses of

the overall sample were conducted.

Everyday Versus Lab Memory Groups

As part of a larger study assessing mood and memory, approximately half of the

participants were taught standard mnemonic techniques ($\underline{n}$ = 38), while the other half were

trained with everyday applications ($\underline{n}$ = 50). Statistical analyses were conducted to

determine if any significant outcome differences existed between the groups following

mnemonic and relaxation training. The following variables were examined: objective

memory improvement (i.e., CVLT, RBMT), subjective memory improvement (i.e.,

MAC-S), and level of depression (i.e., BDI). Two sample $\underline{t}$-tests were conducted to

determine if individuals in the everyday memory group benefited more or less than

individuals who participated in the lab memory group. Mean differences were assessed on

memory and depression measures between pre-test and post-test performance. As Table 1

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shows, no significant differences were found for either the memory or depression variables. That is, the everyday and lab memory training groups performed similarly from pre-test to post-test session in terms of objective memory improvement, subjective memory improvement, and level of depression.

Therefore, in summary, for the purposes of the current investigation those who took part in the everyday or lab memory group were combined due to small samples and since statistical analyses indicated that the treatment effects were not significantly different between the two groups.

Hypotheses

Hypotheses I. It was predicted that group members who receive mnemonic and relaxation training would improve significantly on objective measures of memory, as measured by the total raw score on trials 1-5 on the CVLT and the sum of the standardized scores on the RBMT. Hypothesis I was supported. Operationally, this was tested by assessing the difference between pre-test and post-test performance on these memory measures. A one-sample t-test was conducted to assess the mean differences on memory between pre-test and post-test performance. Significant mean differences were found for the CVLT [$t(88) = 2.86$, $p < .05$] and the RBMT [$t(88) = 6.49$, $p < .05$]. That is, group members significantly improved from the pre-test to post-test session on the CVLT and RBMT, which are both measures of objective memory. The means and standard deviations for the pre-test and post-test performances on the CVLT and RBMT for the whole sample are reported in Table 2.

Table 1: Memory Group Gain Score Mean Differences

Variable	Mean	SD	p
California Verbal Learning Test (Trial 1-5 Raw Score)			
Everyday	2.2	11.7	.36
Lab	4.4	10.0	
California Verbal Learning Test (Short-Delay Free Recall)			
Everyday	.84	3.7	.10
Lab	2.1	3.1	
California Verbal Learning Test (Recognition Hits)			
Everyday	.27	3.0	.65
Lab	.58	3.0	
Rivermead Behavioral Memory Test (Sum of Standardized Scores)			
Everyday	1.4	2.4	.39
Lab	1.9	2.3	
Memory Assessment Clinic Self-Report Scale (Total Score)			
Everyday	4.8	13.4	.53
Lab	6.7	13.2	
Beck Depression Inventory (Total Score)			
Everyday	-1.5	3.9	.96
Lab	-1.6	3.8	

* Significance at the .05 alpha level
** Significance at the .01 alpha level

Table 2: <u>Pre-test and Post-test Means for the Whole Sample on Objective Measures of Memory</u>

Testing Session	CVLT (Trial 1-5 Total Score)		RBMT (Sum of Standardized Scores)	
	<u>Mean</u>	<u>SD</u>	<u>Mean</u>	<u>SD</u>
Pre-Test	44.2	12.1	18.3	4.3
Post-Test	47.6	14.9	19.9	4.1

Hypotheses II. The second hypothesis predicted that as levels of depression increase in group members at pre-test, objective memory benefits associated with mnemonic and relaxation training would significantly decrease. Operationally, this was tested by measuring depression at pre-test with scores on the BDI and total memory recall at the pre and post-test sessions with the CVLT and RBMT. Following Beck's (1987) interpretive guidelines, three depression groups were delineated. Participants in the normal range for depression (n = 61) were those who scored between 0 and 9 on the BDI at pre-test. Participants who scored between 10 and 19 were classified as moderately depressed (n = 23). Finally, those who scored 20 and above on the BDI were classified as severely depressed (n = 4). This hypothesis was tested by an analysis of variance which was performed to determine the effect of depression level (normal, moderate, severe) on memory improvement from pre-test to post-test session. Hypothesis II was not supported. That is, the analysis of variance indicated that none of the three depression groups were significantly different at the .05 level for pre-test to post-test gain on either the CVLT or the RBMT.

Since only four individuals comprised the severe depression group in the sample, a larger group was created by collapsing the moderate and severe depression groups into one "depressed" group. That is, individuals scoring between 0 and 9 on the BDI were classified as the "non depressed" group (n = 61) and those scoring higher than nine on the BDI were classified as the "depressed" group (n =27). This allowed a comparison between a depression group with a larger sample size and the "non depressed" group. A two-sample t-test was conducted to assess the mean differences on memory improvement from pre-test to post-test between these two depression groups. Results revealed nonsignificant findings between the depression groups in terms of objective memory improvement. Nonsignificant mean differences were found for the CVLT [t(88) = .63, p > .05] and the RBMT [t(88) = -.37, p > .05]. That is, objective memory improvement from pre-test to post-test as measured by the CVLT and RBMT was consistently nonsignificant between depression groups as measured by the BDI. The objective memory performance pre-test to post-test mean score differences for the depressed and non depressed groups are reported in Table 3.

Table 3: <u>Objective Memory Performance Pre-test to Post-test Mean Score Differences for the Depression Groups in the Sample.</u>

Depression Group	CVLT (Trial 1-5 Score)		RBMT (Sum of Standardized Scores)	
	Mean	SD	Mean	SD
Depressed Group (N = 61)	3.8	11.4	1.6	2.5
Non-Depressed Group (N = 27)	2.2	9.7	1.8	2.1

Hypothesis III. The third hypothesis predicted that a significant relationship would exist between subjective memory complaints, as measured at pre-test by total MAC-S score, and depression, as measured at pre-test by the total score on the BDI. Hypothesis III was supported. A Pearson product-moment correlation revealed a significant relationship between these measures, (r (88) = -.34, p < .05). That is, people who scored lower on the MAC-S, indicating subjective difficulties with their memory, scored significantly higher on the BDI, indicating higher levels of depression.

Hypotheses IV. The fourth hypothesis predicted that group members receiving mnemonic and relaxation training with normal levels of depressive symptomatology measured at pre-test would improve significantly from pre-test to post-test on a subjective measure of memory. A one-sample t-test was conducted to assess the mean differences on the MAC-S between pre-test and post-test performance for the normal depression group (n = 61). Hypothesis IV was supported. Significant mean differences were found for this group of individuals [t(61) = 3.37, p < .05]. That is, group members who were in the normal range for depression at pre-test significantly improved from the pre-test (M= 123.5, SD = 16.4) to post-test (M = 128.4, SD = 15.7) session on the MAC-S, which is a subjective measure of memory. Therefore, these individuals endorsed fewer memory complaints from the pre-test to post-test session.

Hypothesis V. The fifth hypothesis predicted that age-related differences would be found in total memory recall following mnemonic and relaxation training. Two analyses were

conducted for this hypothesis. First, a one-way analysis of variance was performed to determine the effect of age on objective memory improvement from pre-test to post-test. For the purposes of this analysis, a young/old age group was defined as those under the age of 65 ($\underline{n}$ = 37), a moderate/old age group was defined as those between the ages of 66-75 ($\underline{n}$ = 33), and an old/old age group was defined as those over the age of 75 ($\underline{n}$ = 18). Hypothesis V was not supported. That is, analyses of variance indicated that none of the three age groups were significantly different at the .05 level for pre-test to post-test gain on either the CVLT ($\underline{f}$ = .65, $\underline{p}$ >.05) or the RBMT ($\underline{f}$ = .22, $\underline{p}$ > .05). The objective memory performance pre-test to post-test mean score differences for the three different age groups are reported in Table 4.

Table 4: Objective Memory Performance Pre-test to Post-test Mean Score Differences for the Age Groups in the Sample.

Age Group	CVLT (Trial 1-5 Score)		RBMT (Sum of Standardized Scores)	
	Mean	SD	Mean	SD
Young/Old ($\underline{N}$ = 37)	3.4	11.6	1.6	1.9
Moderate/Old ($\underline{N}$ = 33)	4.6	9.5	1.5	2.7
Old/Old ($\underline{N}$ = 18)	1.0	12.3	1.9	2.6

In addition, a separate analysis was conducted with age treated as a continuous variable. It was predicted that a significant negative relationship would exist between age and objective memory improvement from pre-test to post-test across both memory

measures. Using this separate analysis, hypothesis V was still not supported. For the

CVLT, a Pearson product-moment correlation revealed a statistically nonsignificant

relationship between age and objective memory improvement ($\underline{r}$ = -.09, $\underline{p}$ > .05).

Similarly, for the RBMT, a Pearson product-moment correlation revealed a non-significant

relationship between age and objective memory improvement ($\underline{r}$ = .01, $\underline{p}$ > .05). That is,

no significant relationship existed between age and pre- to post-test gain on objective

measures of memory following mnemonic and relaxation training.

Hypothesis VI. Hypothesis number six predicted that old/old age group members who

were in the normal range for depression would benefit significantly more on objective

memory measures than would young/old and moderate/old age groups who were in the

depressed range. Objective memory was measured using the CVLT and RBMT and

depression was measured using the BDI. As in the second hypothesis, two depression

groups were defined. Those individuals scoring between 0 and 9 on the BDI at pre-test

were defined as the "non depressed" group ($\underline{n}$ = 61) and those individuals scoring greater

than 9 on the BDI were demarcated as the "depressed" group ($\underline{n}$ = 27). That is, the

moderate and severe depression groups were collapsed into one group of depressed

individuals. Again, by defining depression in this way it ensured a larger sample size for

the depressed group. Two analyses were conducted for this hypothesis.

First, a two-way analysis of variance was performed to determine the effect of

depression level (normal, depressed) and age (young/old, moderate/old, and old/old) on

objective memory improvement from pre-test to post-test. Hypothesis six was not

supported using this analysis. None of the main effects of age and depression were significant for the CVLT (Age: f = .43, p > .05; Depression: f = .45, p > .05) or the RBMT (Age: f = 1.42, p > .05; Depression: f = 1.52, p > .05). Also, the two-way interaction effects of age and depression were nonsignificant for the CVLT (f = .50, p > .05) or the RBMT (f = .85, p > .05). Therefore, the old/old age group members in the normal range of depression did not benefit significantly more on objective memory measures than the young/old and moderate/old age group members who were in the depressed range.

In addition, a separate analysis was conducted using age as a continuous variable and looking at the relationship between age and memory improvement within each depression group. It was expected that a positive relationship would exist between age and objective memory improvement in the normal depression group and a negative relationship would exist between these two variables in the depressed group. In the normal depression group on the CVLT, a Pearson product-moment correlation revealed a statistically nonsignificant relationship between age and objective memory improvement (r = .05, p > .05). In addition, in the normal depression group on the RBMT, a Pearson product-moment correlation revealed a nonsignificant relationship between age and objective memory improvement (r = .1, p > .05). That is, no significant relationship existed between age and objective memory improvement in the normal depression group following mnemonic and relaxation training.

In the depressed group on the RBMT, a Pearson product-moment correlation revealed a nonsignificant relationship between age and objective memory improvement

($\underline{r}$ = -.1, $\underline{p}$ > .05). However, in the depressed group on the CVLT, findings revealed a

marginally statistically significant negative correlation between age and objective memory

improvement ($\underline{r}$ = -.4, $\underline{p}$ = .05). That is, as age increases within the depressed group

objective memory improvement from pre-test to post-test on the CVLT significantly

decreases.

<u>Post-Hoc Analyses of the Whole Sample</u>

First, an analysis of the entire sample was conducted to determine whether those

individuals who participated in the mnemonic and relaxation groups improved from

pre-test to post-test in terms of subjective memory. In hypothesis IV, it was determined

that those individuals in the normal range for depression benefited in terms of subjective

memory. Similarly, when the whole sample was examined it was found that the mean

differences for the group were significantly different from pre-test ($\underline{M}$ = 120.2, $\underline{SD}$ = 18.4)

to post-test ($\underline{M}$ = 126.1, $\underline{SD}$ = 17.5) in terms of subjective memory improvement. A

one-sample $\underline{t}$-test indicated significant mean differences from the pre-test to post-test

session in terms of overall subjective memory improvement ($\underline{t}$ (88) = 4.13, $\underline{p}$ < .05). That

is, the overall sample improved in terms of subjective memory following the mnemonic

and relaxation training sessions.

Furthermore, this improvement on subjective memory was consistent between

depression groups. A two-sample $\underline{t}$-test between those in the "nondepressed" group as

compared to those in the "depressed" group was conducted in terms of subjective memory

improvement. This analysis revealed no significant differences between groups ($\underline{t}$ (88) =

-.92, $\underline{p}$ > .05). That is, level of depression measured at the pre-test session was not a

significant moderating variable in terms of subjective memory improvement from the pre-

to post-test session. Therefore, the whole sample benefited in terms of subjective memory

following mnemonic and relaxation training, regardless of the level of depression. The

subjective memory performance (MAC-S) pre-test to post-test mean score differences for

the depressed and non depressed groups are reported in Table 5.

Table 5: Subjective Memory Performance Pre-test to Post-test Mean Score Differences
for the Depression Groups in the Sample

Depression Group	MAC-S (Total Score)	
	Mean	SD
Depressed Group (N = 61)	4.8	11.1
Non-Depressed Group (N = 27)	8.2	17.1

Second, a multiple regression was conducted to see the impact of age and

depression on subjective memory improvement. Results showed a nonsignificant t-value

for both the age (Beta = .01, t = .09, p > .05) and depression (Beta = .12, t = 1.08, p >.05)

variables. Furthermore, the R-square value for this model was only .01, which leaves 99%

of the variability unexplained. Therefore, neither age nor depression were moderating

factors in terms of overall subjective memory improvement.

Third, an analysis of the whole sample was conducted to determine if group

members improved from the pre-test to post-test session in terms of depression level, as

measured by the BDI. When the whole sample was examined, it was found that the mean

differences for the group were significantly different from pre-test (M = 8.2, SD = 6.7) to

post-test ($\underline{M}$ = 6.6, $\underline{SD}$ = 5.1) in terms of overall depression score. A one-sample $\underline{t}$-test revealed significant mean differences in terms of depression level ($\underline{t}$ (88) = -3.95, $\underline{p}$ < .05) from the pre-test to post-test session. That is, group members significantly improved in terms of depression level following the mnemonic and relaxation training sessions.

It is noteworthy that Hypothesis III revealed a significant positive relationship between subjective memory complaint and level of depression ($\underline{r}$ (88) = -.34, $\underline{p}$ < .05). That is, people who scored lower on the MAC-S, indicating subjective difficulties with their memory, scored significantly higher on the BDI, indicating higher levels of depression. Therefore, it follows that group members significantly improved in terms of subjective memory since the overall sample improved in terms of overall level of depression.

Fourth, an analysis of the whole sample was conducted looking at the relationship between age and subjective memory improvement. A Pearson product-moment correlation revealed a statistically nonsignificant relationship between age and subjective memory improvement ($\underline{r}$ = -.1, $\underline{p}$ > .05). That is, younger individuals showed a slightly greater increase in subjective memory improvement from the pre-test to post-test session.

Finally, an analysis was conducted to determine the degree of relationship between age and level of depression improvement from the pre-test to post-test session. A Pearson product-moment correlation revealed a modest significant negative relationship between age and depression improvement ($\underline{r}$ (88) = .25, $\underline{p}$ < .05). Therefore, older participants declined less in depressive symptoms than younger ones.

DISCUSSION

Data analyses were subdivided into three components. First, statistical comparisons were made between the "everyday" memory group and "lab" memory group to determine whether one group out-performed the other in terms of objective memory improvement, subjective memory improvement, and level of depression following the training sessions. Second, the six hypotheses were evaluated. Third, post-hoc analyses of the overall sample were conducted. This same format will be used to discuss the findings of these analyses.

Everyday Versus Lab Memory Groups

Results indicated that the everyday and lab memory training groups performed similarly from the pre-test to post-test session in terms of objective memory improvement, subjective memory improvement, and level of depression. Given these results, there was reasonable evidence to support combining these groups as a whole sample in addressing the research questions that have been posed.

Consistent treatment effects between the everyday and lab memory groups support the findings of a meta-analysis conducted by Verhaeghen, Marcoen, and Goossens (1992) in the area of improving memory performance in the aged through mnemonic training. These researchers reviewed 33 studies and used treatment gain as the criterion measure. Overall, Verhaeghen et al. (1992) examined 13 variables which could have influenced

pre-to-post treatment gains in terms of objective memory improvement. Only four

variables were found to influence treatment gains across these 33 studies. Treatment gains

were largest when the subjects were younger, when pretraining was provided, when

training was carried out in groups, and when sessions were relatively short. Interestingly,

no significant differences could be found in the effectiveness of different kinds of

mnemonic techniques or different types of pretraining. Meta analytic results indicated that

virtually all of the classes of effect sizes for the different mnemonic training programs were

homogenous. Although programs were substantially variable in terms of the stimuli used

and mnemonic training intervention (i.e., method of loci, face-name, internal-external

strategies), the effect sizes in terms of pre-to-post objective memory gain were consistent.

Given the findings of the Verhaeghen et al. (1992) meta analysis, it is not

surprising that no significant differences in this study were found between the lab and

everyday memory groups. This is especially true considering that the only difference

between groups was the memory stimuli used for training. For example, participants in

the lab memory group were taught strategies for learning arbitrary word lists, while

participants in the everyday group were taught strategies for shopping items and errands.

Both groups received the same amount of mnemonic training using the same learning

techniques and strategies. These findings suggest that mnemonic techniques generally

provide subjects with an effective strategy to organize and encode the stimulus material

and that changing the memory stimuli to be learned does not have an additional affect on

training outcome. Finally, both groups received the same educational handouts delineating

the mnemonic techniques and addressing age-related concerns. Individuals in both groups

were provided with handouts discussing topics such as memory awareness and self-evaluation, age-related memory decline, memory and self-concept, self-change skills, pleasant activities and depression, positive thinking, assertiveness, and maintaining your memory power. For the purpose of replication, these educational handouts can be found in Appendix A.

Hypotheses

The present study proposed to investigate the relationship between depression, imagery-based mnemonic and relaxation training, objective memory, and subjective memory in greater detail. To attain this goal, we first attempted to assess the efficacy of a multifactorial training program aimed at improving memory performance in the aged. This program consisted of visually-based mnemonic training sessions (i.e., method of loci technique, face-name mnemonic), relaxation training, and an educational workshop aimed at addressing age-related concerns. The format implemented to assess the effectiveness of this training program consisted of (a) a pre-test assessment of memory (i.e., objective and subjective memory) and level of depression, (b) a seven session group training workshop, and (c) a post-test assessment on equivalent forms of the original assessment. Consistent with the findings by Verhaeghen, Marcoen, and Goossens (1992), memory training was conducted in groups of 4-9 individuals over the age of 55 with each session lasting for approximately one hour.

The Effects of the Multifactorial Program on Objective Memory Improvement

The first analysis revealed that the program was successful in that group members improved from the pre-test to post-test session on the California Verbal Learning Test (CVLT) and the Rivermead Behavioral Memory Test (RBMT), which are both measures of objective memory. This finding supports the notion that imagery based mnemonic and relaxation training programs are successful in improving objective memory in an elderly population. Previous research has shown the effectiveness of the method of loci technique (Anschutz et al., 1985; Baltes, 1992; Brooks, 1993; Rose & Yesavage, 1989; Yesavage & Rose, 1983; Yesavage & Rose, 1984) and the face-name mnemonic (Gratzinger, 1990; McCarty, 1980; Yesavage, Rose & Bower, 1983; Yesavage & Rose, 1984) in improving objective memory in elderly populations. In short, these types of mnemonics may provide an individual with an active strategy to organize and encode verbal information, thus countering the age-related deficits which have been found in this area.

Furthermore, it appears that relaxation training may be an effective supplement to the mnemonic interventions. Results of this study corroborate previous research that has shown relaxation training to be an effective mode of intervention in improving objective memory performance in the elderly (Yesavage, 1984; Yesavage & Jacob, 1984). Lichstein (1988) has claimed that relaxation training increases available memory processing capacity by objectively improving levels of attention. Therefore, this type of training appears to be an important adjunct to the mnemonics since Kinsbourne (1980) has noted various impairments in attention and concentration in the elderly.

Overall, it appears that the multifactorial mnemonic and relaxation training approach used in this study was effective in improving objective memory in an able elderly population. It is noteworthy that this type of multifactorial approach has less often been the focus of research, with more studies examining the implementation of a single program (i.e., method of loci or face-name mnemonic or relaxation training). However, our findings are in agreement with that of Neely and Backman (1995), who combined the method of loci technique, attention and concentration training, and relaxation training in an able elderly population. Similar to our findings, they concluded that a multifactorial training approach was an effective mode of intervention for older adults in terms of objective memory improvement.

The Effects of Depression on Objective Memory Improvement

In taking a closer look at studies conducted in the area of mnemonic training and objective memory performance, it was found that depression was either not considered as an outcome variable or controlled for when selecting participants (Kleigl, Smith & Baltes, 1989; McCarty, 1980; Rose & Yesavage, 1983; Yesavage & Rose, 1984; Yesavage & Rose, 1983; Yesavage, Rose & Bower, 1983). Therefore, the effects of depression on objective memory improvement is unknown at the present time. However, it is possible that a more distal factor, such as mood state, has a direct effect on the ability to benefit from mnemonic training. More specifically, depression may be responsible for problems in acquisition, retrieval, or application of the mnemonic training. Considering the prevalence of depression in the elderly and the generally accepted finding that depression directly

affects encoding, it was clear that the effects of depression on mnemonic training outcome needed to be closely examined.

The second hypothesis predicted that as levels of depression increase in group members at pre-test, objective memory benefits associated with mnemonic and relaxation training would significantly decrease from pre-test to post-test. However, the second analysis revealed that no significant differences in objective memory improvement existed between those with normal depression versus those with mild/moderate depression versus those with severe levels of depression. Importantly, however, it was found that our overall sample was healthy in terms of depression level. Specifically, only four out of 88 individuals in the sample (4%) were classified to be severely depressed. Therefore, another analyses was conducted looking at individuals with normal levels of depression versus a larger group of individuals who scored above the normal level of depression, as determined by Beck's (1987) interpretive guidelines. However, results still revealed nonsignificant findings between the depression groups in terms of objective memory improvement from the pre-test post-test session.

Literature in the area of depression and cognitive performance in the elderly have shown that in "effort demanding" tasks, depressed older adults show mild attentional difficulty, "shallow" encoding of information, decreased response latency, and reduced verbal fluency (Hunter & Schmidt, 1990; Lamberty & Bieliauskas, 1993; and Weingartner, 1981). Since mnemonic training can be considered as an "effort demanding" process which requires considerable cognitive exertion and mental awareness, why does

depression level not have a significant effect on our sample of older adults in terms of objective memory improvement?

The answer to the above question may have to do with the health of our sample in terms of depression level. Again, sixty-one of the individuals in our sample (69%) were classified as having normal levels of depression, according to the interpretive guidelines for the Beck Depression Inventory (Beck, 1987). Conversely, twenty-three individuals were classified as scoring in the mild to moderate range for depression and only four individuals in the sample were classified as severely depressed. By collapsing the mild/moderate and severe groups into one sample, there were twenty-seven individuals (30%) with measurable levels of depression.

Although epidemiological data about the incidence and prevalence of mood disorders in the elderly do not yield a complete and consistent picture (Blazer, 1983), the occurrence of depressive symptoms seems high in the elderly ranging from 5 to 40 percent, depending on the method of measurement (Lamberty & Bieliauskas, 1993). Ruegg, Swerdlow, and Zisook (1988) have also stated that "depression is among the most prevalent health problems of the elderly, occurring for the first time in about 10 to 20 percent of the population 60 years of older." Notably, these researchers used the BDI in their epidemiological survey, defining depression as those who scored greater than 20 on the measure. Therefore, we can conclude that our sample was not typical of the general elderly population in terms of level of depression. In essence, we were comparing a group of individuals who were in the normal range of depression to a group who evidenced mild levels of depressive symptomatology.

In a thorough review of the literature in the area of depression and cognition in the elderly, Lamberty and Bieliauskas (1993) stated that non-major depression does not appear to have significant influence on patients' performance on standard cognitive screening measures. Moreover, a recent 10-year longitudinal study conducted by Tranel, Benton, and Olson (1997) indicated that older persons remaining in good health (i.e., no depression symptoms) evidenced age-related decline in higher order mental capacities, such as language, intellect, perception, and decision making. Therefore, in our relatively healthy sample, mild levels of depression may have had a negligible effect on information processing, learning, and memory, three areas which are critical for mnemonic training.

Furthermore, Weingartner (1981) has found that depressed patients fail to engage in encoding strategies that maximize the likelihood of subsequent recall. Specifically, he hypothesized that events become less memorable since depressed patients appear to use incomplete encoding strategies to organize the learned information. More importantly, however, findings suggested that depressed patients were able to benefit and learn when material was presented in an already organized fashion. One of the main objectives of our multifactorial training program was to teach older individuals how to use an active strategy in organizing verbal information. Therefore, it is possible that the mnemonic training strategies provided an appropriate intervention for mildly depressed individuals in that they learned to effectively encode and process learned information that would maximize the likelihood of subsequent recall. Furthermore, it is likely that these mnemonic strategies were augmented by relaxation training and educational efforts which addressed age-related memory concerns.

In summary, it appears that minimal levels of depression had no detrimental effect on objective memory improvement from the pre-test to post-test session. However, it should be noted that these data are applicable only to individuals with levels of depression similar to the participants used in the present research.

The Effects of the Multifactorial Training Program on Subjective Memory Appraisal

Community surveys have indicated that one half of persons over the age of 60 report serious memory problems (Lowenthal et al., 1967). Another study has shown that more than two-thirds of persons over the age of 75 have expressed concerns about memory loss. The results of these studies coincide with the finding that reliable decrements in abstract reasoning and speed of processing have been shown to occur, on average, during the sixth decade of life (Cunningham, 1987). Furthermore, with the fear of such insidious diseases as Alzheimer's and other progressive neurological illnesses, it is not surprising that the integrity of one's memory looms large for the elderly. Surprisingly, however, previous literature has suggested that there is a marked incongruity between complaint about memory and actual memory performance. In short, complaints have been shown to occur with or without an actual deficit in memory (Kahn, Zarit, Hilbert & Niederehe, 1975). It has been proposed that affective status may be the critical factor related to this apparent discrepancy between complaint and functioning.

Following this line of thinking, statistical analyses for our third hypothesis revealed that a significant relationship existed between subjective memory complaint and depression. This finding parallels previous research in the area (Collins & Abeles, 1996;

Derousene et al., 1988; Kahn et al., 1975; Larrabee & Levin, 1986; Williams et al., 1987) and adds to the clinical lore that emphasizes subjective memory complaints as a diagnostic indicator for depression.

A major aim of the present study was to examine the effects of a multifactorial training program not only on objective memory improvement, but also on the improvement of subjective complaints of memory. Considering the prevalence of subjective memory complaints in the elderly, improvement in this area should become an important focus for memory training programs. This is especially true since no study to date has found a reliable positive effect of memory training on subjective memory as tapped by various metamemory questionnaires. With these findings, the question of whether the effects of mnemonic training are of sufficient magnitude to warrant the training effort can be raised. If the elderly do not subjectively perceive positive changes in their memory after training in mnemonics, of what utility are the measurable changes in objective memory?

For this study, the fourth hypothesis predicted that depression would play a critical role in understanding the relationship between mnemonic training and improvement in subjective memory. In looking at the effects of mnemonic training on subjective memory appraisal, previous research concluded that depression was not a moderating variable in the cognitive training-subjective memory relationship (Scogin, Storandt & Lott, 1985; Verhaeghen, Van Ranst & Marcoen, 1993; Zarit, Cole & Guider, 1981). However, since there was a general consensus in previous literature indicating that a relationship existed between subjective memory complaint and depression, our study predicted that depression

would play a moderating influence on this relationship. Specifically, since mnemonic training theoretically provides interventions specific to memory and not to depression, it was predicted that those with higher levels of depression would not benefit in terms of subjective memory following the multifactorial training program. Conversely, it was predicted that those with lower levels of depression would improve in the area of subjective memory since the training was directly applicable to their memory concerns and would result in a more favorable subjective appraisal.

An initial analysis of our data supported this original hypothesis. That is, group members who were in the normal range for depression at pre-test significantly improved from the pre-test to post-test session on the total score of the Memory Assessment Self Report Scale (MAC-S), which specifically measures subjective memory complaints. This finding is clinically significant since no published study to date has found a reliable positive effect of memory training on subjective memory. As Verhaeghen et al. (1992) stated from the findings of his meta-analysis, "nothing can be inferred about the impact of mnemonic training on everyday memory performance or on metamemory." Therefore, our preliminary findings indicated that mnemonic, relaxation, and educational training was effective in improving subjective memory in those who were in the normal range for depression.

However, a post-hoc analyses of the whole sample also indicated that those with measurable symptoms of depression at pre-test (n = 27) also benefited in terms of subjective memory improvement. Furthermore, analyses revealed that there was no significant difference between the normal depression group and depression group in terms

of subjective memory improvement from the pre-test to post-test session. These findings contradicted our hypothesis that only the "normal depression" group would benefit in terms of subjective memory. In other words, the whole sample, regardless of depression level, was found to benefit from the pre-test to post-test session in terms of subjective memory.

Since statistical analyses revealed that subjective memory complaints were positively correlated with depression at the pre-test session, another post-hoc analysis was conducted to determine whether individuals in our sample benefited in terms of depression level from the pre-test to post-test session. When the whole sample was examined, it was found that mean differences for the group were significantly different in terms of overall depression score. That is, group members significantly improved in terms of depression level following the training sessions. In short, this finding may help explain why individuals improved from the pre-test to post-test session in terms of subjective memory complaint.

Again, there is a general consensus in the literature that subjective memory complaints are more of an indicator for depression than for objective memory dysfunction. Our study indicates that depression may be a crucial factor in helping to explain our findings that individuals improve after training in terms of subjective memory complaints. In essence, the training intervention may need to specifically address the issue of depression for subjective memory appraisal to improve following the intervention. In the handful of studies which examined the improvement of subjective memory complaints following mnemonic intervention, it was found that depression scores remained stable or

were not measured from the pre-test to post-test session (Scogin, Storandt & Lott, 1985; Verhaeghen, Van Ranst & Marcoen, 1993; Zarit, Cole & Guider, 1981). Hence, there was no reliable, positive effect of memory training on subjective memory. However, Plotkin, Mintz, and Jarvik (1985) found that improvement in depressive symptoms was significantly related to a decrease in subjective memory complaints following tricyclic antidepressant therapy and group psychotherapy. Similar reductions in subjective memory complaints were evidenced between the two modes of intervention. Therefore, it appears that mnemonic training interventions for the elderly may benefit from directly addressing the issue of depression during the training sessions.

A limitation of this current study is that we can not specifically state why individuals improved in the area of subjective memory. Although we can say with some confidence that subjective memory improvement was concomitant with an improvement in depression, what was it about our training efforts that differed from previous efforts in the area?

One possible explanation is that our intervention was based on a multifactorial training approach. Specifically, the intervention consisted of training with mnemonic interventions, relaxation training, and educational workshops which dealt with common age-related concerns, including depression. Conversely, for example, Scogin, Storandt, and Lott's (1985) intervention was a self-taught program of memory skills training which utilized mnemonic training (i.e., method of loci, face-name mnemonic) and some "basic" information about memory in later life. Importantly, training was self-paced in this study and done at home by each participant, without group interaction. Our program was done

in a group format, which has been shown to affect treatment gains (Verhaeghen et al., 1992) in terms of objective memory. Furthermore, we placed a strong emphasis on group discussion across various subject areas. These areas included the topics of memory awareness and self-evaluation, age-related memory decline, memory and self-concept, self-change skills, pleasant activities and depression, positive thinking, assertiveness, and maintaining your memory power (Appendix A). Again, the topic of age-related depression was a common theme across these subject areas. It may be that this group discussion format facilitated a more positive self-appraisal for individuals in the group, resulting in decreased depression levels and improved subjective memory scores. Furthermore, the inclusion of relaxation training in our intervention may have reduced anxiety levels, leading to a more positive self-evaluation in terms of depression and subjective memory.

A second possibility is that the Memory Assessment Self-Report Scale used in this study better tapped the aspects of metamemory that change with memory training. Stability of subjective memory complaints (and depression) following training was found in previous studies (Hill et al., 1988; Loonen & Richter, 1988; Rebok & Balcerak, 1989; Scogin et al., 1985; Zarit, Cole, & Guider, 1981; Zarit, Gallagher, & Kramer, 1981), all of which used questionnaires other than the MAC-S. As Verhaeghen, Van Ranst, and Marcoen (1993) stated, changes in metamemory following training may be more subtle and have more to do with feelings of control, giving participants the feeling that they can take memory functioning "in their own hands." These researchers hypothesized that the memory functioning questionnaires used in the above studies failed to tap those increased

feeling of adequacy. It may be that the MAC-S does a better job of measuring these constructs and is more sensitive to those aspects of memory which are addressed with mnemonic training interventions. Replication studies in the area of improving subjective memory through mnemonic training with the MAC-S may be indicated to address this issue of measurement.

A third possibility for the relative success of our training program may have to do with the relative health of our sample in terms of depression level. Again, our elderly sample was far below the prevalence and incidence levels for depression that have been previously reported in epidemiological research. The initial hypothesis that those with lower levels of depression would improve in the area of subjective memory since the training was directly applicable to their memory concerns may be accurate in the sense that our sample was relatively healthy in terms of depression level. If our sample had included more individuals with severe levels of depression, there may have been differences between the depression groups. Specifically, it was predicted that those with higher levels of depression would not benefit in terms of subjective memory following the multifactorial training program since such training does not provide depression-specific intervention. Therefore, the failure to detect differences between our depression groups may reflect a sampling bias. Ideally, future research should examine the effectiveness of a multifactorial training program in terms of subjective memory with a more severely depressed subgroup of individuals.

Cognitive Retraining in the Elderly: Cohort-Related Differences in Performance

In the mnemonic training outcome literature, probably the most frequently investigated individual difference is age. The typical design includes the contrast of two to three age groups. Invariably, these studies compare young adults and middle-aged adults to older adults in terms of objective memory improvement. Not surprisingly, the general finding of these studies is that older adults improve in terms of objective memory but the amount of objective memory improvement is less in older subjects than younger adults (Lacheman & Jelalian, 1984; Lovelace & Marsh, 1985; Rebok & Balcerak, 1989; Rose & Yesavage, 1983; Yesavage & Rose, 1984). In a meta-analytic review, using cross-sectional samples, Verhaeghen et al. (1992) concluded that memory plasticity decreases monotonically over the adult life span. These researches attributed poorer performance in the elderly sample to difficulties in the acquisition, retrieval, and application of the mnemonic strategies.

However, only scant attention in mnemonic training research has been given in examining the differences between age groups within an elderly sample. A main objective of this study was to examine whether differences in objective memory improvement would occur between young/old, moderate/old and old/old age groups following mnemonic training efforts. A large body of research (Salthouse, 1985; Waugh & Barr, 1980) has indicated that the old/old (over the age of 75) differ in terms of speed of processing relative to the young/old (between the ages of 55 and 64). In theory, this slowing of processing speed may result in the old/old requiring more time to learn the techniques, and, once they have learned them, more time to implement them during a testing session.

Therefore, for this study it was hypothesized that objective memory improvement would differ between age groups within our elderly sample. Findings did not support this hypothesis. That is, no significant relationship existed between the three age groups and pre- to post-test gain on objective measures of memory following the mnemonic, relaxation, and educational training. In addition, when age was treated as a continuous variable, findings failed to reveal a significant relationship between age and objective memory improvement. Therefore, in our sample of older adults, age was not a moderating factor in objective memory improvement. Again, it is important to note that previous research has failed to specifically address the issue of objective memory improvement following mnemonic training within different elderly age groups. However, recent longitudinal research (Tranel, Benton, & Olson, 1997) indicated that healthy older adults remained stable in terms of higher order cognitive functioning over a 10-year period. These researchers concluded that mental decline across a broad range of cognitive abilities should not be viewed as an inevitable correlate of the aging process. Our findings, also within a healthy sample of older adults, corroborate these conclusions and suggest that memory remains plastic even in persons in the 8th and 9th decade of life.

One caveat of these findings is that further analyses did reveal a modest statistically significant negative correlation between age and objective memory improvement in the depressed subgroup of elderly individuals. That is, as age increased within the depressed subgroup, objective memory improvement significantly decreased. This finding indicates that older individuals who are depressed may have more difficulty in benefiting from mnemonic training in terms of objective memory performance. In terms of this study and

consistent with the speed of processing hypothesis in age-related memory decline, it may

be that age alone does not significantly reduce one's speed of processing, resulting in

measurable objective memory improvement differences.   However, when older

individuals are even mildly depressed, these two factors may act in combination to

produce measurable differences in levels of objective memory improvement. This is

especially true considering that depression has been associated with a shallow encoding of

information and processing speed (Lamberty & Bieliauskas, 1993). Considering these

findings, older elderly individuals who are depressed may benefit from a treatment which

first addresses depression specifically prior to mnemonic training efforts. Our findings

indicated that older individuals can benefit from mnemonic training if depression levels are

in the normal range. However, as age increases even mild levels of depression may affect

objective memory treatment gain.

In addition, a post-hoc analysis of the whole sample was conducted examining the

effects of age on subjective memory improvement. Analyses revealed a statistically

nonsignificant relationship between these two variables. That is, individuals in our sample

improved from the pre-test to post-test session in terms of memory complaints and this

improvement was not related to the age of the participants. Again, this investigation is the

first study to date which has shown a reliable, positive effect of cognitive retraining on

subjective memory complaints. Therefore, it is not surprising that no study to date has

shown age to be a moderating variable in terms of subjective memory improvement

following training efforts. Our study indicates that a multifactorial training approach can

be effective, regardless of age, in improving subjective memory.

Finally, a post-hoc analysis also revealed that a modest significant negative relationship existed between age and depression improvement. That is, the amount of depression improvement was less in older subjects than younger subjects. This finding is consistent with the previous finding of this study that older individuals who are depressed benefit less in terms of objective memory improvement. Once again, a practical consideration in light of this finding is that older elderly individuals who are even mildly depressed may benefit more by depression-specific treatment (i.e., psychotherapy) or instead of engaging in mnemonic, relaxation, and educational training.

Conclusions and Suggestion for Future Research

A multifactorial training approach, including mnemonic training, relaxation training, and educational training is an effective training protocol. It appears that memory remains plastic even in older age. These results, similar to those of previous studies, revealed that older individuals benefited in terms of objective memory following the seven sessions of training. This finding provides further support to the notion that imagery-based mnemonic and relaxation programs are successful in improving objective memory in an elderly population. Contrary to previous research in the area of subjective memory, our training efforts were also effective in improving memory complaints from the pre-test to post-test session. Furthermore, the improvement in subjective memory appears to be concomitant with a decrease in depression levels over the course of the training sessions. It is important to note that these findings directly contradict a recent review in the area (Verhaeghen, Van Ranst, & Marcoen, 1993), which stated; "It is highly doubtful

that these training programs have a beneficial effect on memory functioning, and the

present research shows that a decrease in complaints is not to be expected." (p. 533).

The success of our training program relative to other researched programs may be

attributed to the combination of three factors. First, our program consisted of a

multifactorial training approach which not only utilized mnemonic and relaxation training,

but also placed a strong emphasis on group discussion of age-related memory concerns

(See Appendix A). It may be that this group discussion format in conjunction with

mnemonic and relaxation training facilitated a more positive self-appraisal for individuals

in the group, resulting in decreased depression levels and improved subjective memory

scores. Second, our sample of older adults were relatively healthy in terms of depression

symptomatology. If more severely depressed individuals were included in the group, it is

possible that only those individuals with normal and mild levels of depression would have

benefited in terms of subjective memory complaints and depression. Third, the possibility

exists that the Memory Assessment Self-Report Scale used in this study better tapped the

aspects of subjective memory that change with memory training. Our study appears the

first to use this subjective memory measure in the study of mnemonic training outcome.

Lastly, our study indicates that a multifactorial training approach can be equally

valuable for different age groups within an elderly sample in terms of both objective and

subjective memory improvement. However, it was shown that older individuals in the

sample benefited less in terms of objective memory improvement if they evidenced even

mild levels of depression symptomatology at the pre-test session. Therefore, old/old

individuals who evidence measurable levels of depression symptomatology may be advised

to seek depression-specific treatment prior to engaging in a multifactorial cognitive retraining program.

While this study is a preliminary investigation, it has provided us with many suggestions for future research.

Ideally, future research should utilize multifactorial training programs similar to the program in this study and examine outcome in a more severely depressed subgroup of elderly individuals. There is a consensus in the literature that severe depression is related to decreases in both memory performance and subjective memory appraisal. Mnemonic training outcome may be similarly affected by increased levels of depression. The present sample was far below the prevalence and incidence levels for depression previously reported in epidemiological research. Therefore, it is clear that the effects of depression on mnemonic training outcome needs to be more closely examined. In short, elderly individuals with severe levels of depression may be ill-advised to engage in mnemonic training if future studies indicate that there is not an improvement across the areas of objective memory, subjective memory, and depression level. Conversely, these individuals may be advised to seek depression-specific treatment prior to the multifactorial training protocol. In this respect, a "streamlining" of treatment approaches for older individuals with subjective memory complaints could begin to take shape.

A second recommendation for future research is to examine what aspects of this particular training protocol resulted in objective memory improvement, subjective memory improvement, and reduced levels of depression symptomatology. Again, it is noteworthy that the type of multifactorial approach used in this study has less often been the focus of

research, with more studies examining the implementation of a single program (i.e., method of loci or face-name mnemonic or relaxation training). This study appears the first to find a reliable, positive effect of mnemonic training on both subjective memory complaints and depression. Therefore, this type of approach is indicated for older individuals with minimal levels of depression. However, a limitation of this current study is that we can not identify why individuals improved across the three areas of concern. Future research needs to tease out the effects of mnemonic training (i.e., method of loci, face-name mnemonic), relaxation training, attention/concentration training, and the type of educational group training which was implemented for this study. Furthermore, future research should examine whether older adults maintain these memory and depression gains over time, and if so, for how long. Such research work might lead to a more efficient and cost-effective treatment protocol for subjective memory complaints. Such an effort is certainly warranted considering that community surveys have indicated that one half of persons over the age of 60 report serious memory problems (Lowenthal et al., 1967).

This study also lent credence to the belief that subjective memory complaints may be associated with depression. However, much more research needs to be done in the area. This is true since subjective memory complaint may also be an early symptom of a degenerative disorder such as Alzheimer's disease. Information relating the accuracy of these complaints and how they specifically involve different aspects of depression could aid health care workers in formulating more accurate diagnoses. Future studies should carefully assess this relationship to help clear up the diagnostic picture. If this were accomplished, people's self-reports of memory could actually help serve in describing the

nature of the disorder and help with future treatment planning. Specifically, those found to have subjective memory complaints which were unrelated to a dementing disorder could be referred to a training program such as the one utilized for this study. Such an approach would be invaluable for the mental health of our elderly since subjective memory complaints are especially common in this population and since the incidence and prevalence of actual progressive memory disorders is relatively low.

However, in order to study the validity of subjective memory complaints, more research needs to be conducted in the measurement of subjective memory. It is possible that the Memory Assessment Self-Report Scale used in this study better tapped the aspects of metamemory that change with memory training. As Verhaeghen, Van Ranst, and Marcoen (1993) stated, changes in metamemory following training may be more subtle and have more to do with feelings of control, giving participants the feeling that they can take memory functioning "in their own hands." It may be that the MAC-S does a better job of measuring these constructs and is more sensitive to those aspects of memory which are addressed with mnemonic training interventions. Future research needs to address this issue. In addition, efforts into the construction of additional subjective memory measures should be considered. Specifically, such measures should allow for the adequate discrimination of the frequency, type, quality, and degree of memory difficulties. If the memory questionnaire is too general or only examines the frequency of memory problems, such as many existing questionnaires, potential interrelationships with memory recall and depression may be masked.

Finally, as outlined in this study, outcome findings following intervention vary widely. Little is known about the predictors of response to training. The present findings suggest that a mutifactorial approach may be helpful. Furthermore, it is hoped that the issue of depression will be more closely evaluated in studies following this research. However, other important variables to consider are the effectiveness of these techniques across different socio-economic and cultural groups. This study, as well as the majority of reviewed studies, have explored the effectiveness of training with white middle-class samples. Therefore, a number of potential sampling biases may limit the generalizability of these results. In short, we know little about the effectiveness of these techniques in African-American, Hispanic, Asian populations etc., nor do we know if the memory complaints are similar across socioeconomic and cultural strata. It is highly recommended that future research address such issues.

APPENDIX A

APPENDIX A

Educational Handout #1: Memory Awareness and Evaluation

Most of us are not aware of how we use our memory and e usually don't realize

the mental effort we are expending. We aren't aware of the methods we use to remember,

nor do we know why we forget.

<u>Choosing what to remember</u>

1. You can't remember everything; it's just not humanely possible. Thus, the first step in

maximizing your memory power is to make choices about what to remember.

2. You must recognize and apply mental effort when it is needed. Assuming that you'll

remember what is important is not enough to guarantee remembering.

3. Be aware of your memory choices and make sure they are the best ones for you. In

this way, you focus your attention on retaining some information and disregarding other

things. By applying your effort and mental energy selectively, you give yourself a greater

chance of memory success.

4. Maximize your strengths by taking on tasks that are related to a subject with which you

have some familiarity and that can be approached with memory methods that word well

for you. Also, take into account the time you have available for memorizing. As you

become more experienced with a variety of memory strategies, you will gain confidence in

tackling unfamiliar material.

5. Choosing to forget things that are not important or necessary to you (for example, movie plots, details of a book) can maximize your memory power.

6. Shared memory systems are those that develop between people who live with each other, such as a husband and wife. In such a system, the memory requirements of their shared lives are divided up, with each providing cues (cues are like a hint) and reminders for the other. For example, one spouse may take on all responsibility for maintaining the family cars while the other may be responsible for paying all the household bills.

Choosing how to remember

Awareness is critical. You need to be aware of the memory techniques you can choose from and the reasons for choosing one over the another. Without this awareness, you will probably unconsciously use a well-practiced but perhaps inappropriate strategy from you repertoire. For example, you may be a visualizer who typically remembers by using mental pictures. This technique will not word best for some information you must remember.

1. Be aware of your memory strategy options. As you learn more about the different strategies available, you will be able to choose the best ones for the memory activities you need to do.

2. External memory strategies, such as writing notes or using calendars, can expand your memory power since their correct application requires thinking.

3. Make the strategy fit the task. As you probably already know, a datebook or calendar is the most practical way to recall appointments. In such cases, other memory strategies, such as visualization, are not as effective.

4. Combining internal strategies, such as repetition or verbal elaboration, with external strategies, offers the greatest memory power possible. This technique not only maintains your internal memory skills through regular use but also prevents the overload of internal memory. We will learn more about the different types of internal and external memory strategies in future sessions.

Self Evaluation

Most people use very few strategies and are basically quite happy being unaware of how they use them. However, becoming aware of what you do to remember is an important first step if you want to improve your memory. You can increase your memory power most effectively by identifying and building on your existing memory strengths. The following memory tasks should help identify the strategies you are already using:

1. Commit new information to memory

2. Remember and complete some errands or activities

3. Remember habitual routines

4. Remember past events

There are a number of strategies useful in accomplishing these memory tasks. To commit new information to memory, you may read the material aloud again and again, or create lists which group what you are trying to remember into similar categories. To remember to do something, you may make lists and post them in a regular place, or visualize yourself doing the errand. Remember habitual routines, such as locking the door when you leave, may be accomplished by asking yourself "Did I lock the door?" Recalling past events may be done with photo albums or old letters. You may already be using

these, or other memory strategies. Some memory strategies may be new to you however. During this course, we will introduce you to a variety of memory strategies and have you practice them.

Educational Handout #2: What Happens to Your Memory as You Get Older?

1. Your thinking gets slower as you get older. It will take longer to solve problems and to get something out of your memory. You will especially notice this when you must solve a problem right away and can't take the time to really think about it. It is also very evident when you are doing something very difficult or that you have never done before. One way around this is that the more familiar you are with a task, such as sewing, the less you will slow down as you get older. So one thing that you can do is try to keep up with the things that interest you. The more you do them, the less you will slow down as you get older.

2. You use memory strategies less often as you get older. You may use them less often because your thinking is getting slower or because the information is told to you too fast to think of a memory strategy. Also, you may just get out of practice from not using them a lot because you have never learned memory strategies in the first place. This last reason is very common. Many people only learned information in school by rote. This is where you go over the information again and again till you remember it. Even if you haven't used memory strategies before though, don't worry. You can still learn them and they can increase your memory ability by half!

3. It becomes harder to pay attention as you get older. You may have found that it is easier to become distracted by noise and people around you. This is especially true if you have to wear a hearing aid. At a get-together, it is much harder to follow more than one conversation at the dinner table at the same time. This is also the reason for misplacing

your keys and glasses. During this course, we will also teach you ways to improve your attention and concentration.

4. Learning something takes longer as you get older, so don't be anxious if it takes more time to learn something than you think it should. It just takes longer, it doesn't mean you can't learn it. Give yourself the extra time to learn something, try to enjoy what you are learning, use memory strategies, and practice, practice, practice!

5. You need more cues as you get older to remember something. Remember, cues are like a hint. They help you remember something. For example, your daughter may help you remember where a snapshot was taken by cues. She may say, "Remember mother? This picture was taken at grandma's house. It was cousin Jack's birthday. It was really hot and we all went swimming." Here, the daughter is using her grandma's house, the birthday, the heat, and the swimming as cues, to help the mother remember when the picture was taken. The more of there hints you have, the easier it is to remember something.

Educational Handout #3: Memory and Self Concept

1. The negative stereotypes regarding aging are one of the primary reasons that middle-aged and older people have low self-confidence about their memory abilities. Just look at TV shows. The female bailiff that used to be on Night Court always made negative comments about herself that were related to age. What you should really see is that she was a very good actress who learned her lines every week just as well as the younger actors and actresses.

2. These portrayals of what happens with old age are changing. Have you seen that advertisement with the older people out motorcycle riding in their red leather clothes? The phrase, "I'm not getting older, I'm getting better," is heard a lot more often now.

3. Even if you don't believe this negative view, it can still influence your thinking since it is all around you. For example, you may begin to put yourself in the shoes of those you see on TV and begin to feel what they are feeling. Slowly, it can change the way you think.

4. Other older individuals actually accept the myth of severe memory decline, as much as, or more so, than younger people do. Part of it may be due to when you were young. Then it was commonly believed that senility was inevitable and everyone would eventually be afflicted with it. Although we now know this isn't true, it is hard to throw off the years or false beliefs, especially if you learned them when you were young.

5. Have you ever noticed that when memory failures occur, the reason other people give for the person's problems seems to depend on how old the person with the problem is.

For example, if the person is older, the problems are due to the age of the person. If it is a younger person with some problems, it is due to memory overload.

6. If you believe in this negative stereotype, even unconsciously, you have set up a barrier for yourself. The barrier is a low memory self-concept. which mean that you don't have confidence in your memory ability. This lack of confidence can prevent you from maintaining or improving your memory.

A lack of self-confidence hurts you memory ability in four ways:

1. It increases your anxiety and/or depression about memory losses, even if these losses are only imagined. People who have a low self-concept about their memory sometimes worry so much about their ability that they become anxious or depressed. Even though these are normal feelings when one is confronted with a real loss, it will decrease your memory abilities when you worry non-stop over memory losses that may never occur. Such a fear is common in those with a negative belief about what happens with aging. Anxiety interferes with effectiveness remembering. So, if you are nervous that you might forget something, there is a good chance that you will forget it. This can happen at any age. Do you remember taking tests when you were back in school? If you were really nervous about a certain test, chances are you didn't do as well as you could have.

2. It lead you to use an unrealistic yardstick to evaluate your own abilities. Your self-concept can also get worse if you make unrealistic demands on yourself. Remember, you are expecting too much of yourself if you don't take extra time to study something you want to learn. You are being unrealistic if you think you will be able to concentrate on reading with the TV set blaring in the next room. When you cannot learn as quickly as

you used to, and cannot concentrate as well, you need to recognize that you may be experiencing normal age-related changes, instead of thinking that your mind or your memory is deteriorating.

The worst thing about a low self-concept is that it all leads you to emphasize your failures. You are likely to jump on every small memory mistake as "proof" of your failing mind. You "forget" that your memory never did function perfectly all the time. With a negative self-concept, you fail to notice the number of successes you have every day. If you notice every failure and none of your successes, your self-confidence will dwindle to nothing.

3. It results in reduced memory effort. Lowered self-confidence, even if it is not based on the truth, can lead you to act in ways that weaken your existing memory skills. You may give up too easily on a memory task. You may not ask anyone for help because you are certain you cannot improve. You may not try new memory strategies because you presume that the effort will be wasted. This type of behavior is self-defeating and will help cause your memory to actually get worse. When you give up in the face of new situations that require memory effort, your failure further reduces your self-concept. You will believe even more strongly that you won't succeed, no matter what you do.

4. It discourages you from seeking intellectual stimulation. When you have a low self-concept about your memory ability, you are very likely to create a world around you that does not require you to think very much. You may not take on intellectual challenges because you have a fear that you will fail. Because myths about aging are so widely accepted, you may find, as you get older that people around you suggest that you retreat

from difficult tasks. They may recommend a narrowing of life's challenges, even though challenge is how we continue to thrive. In a well-meaning way, they will offer to do things for you. When you leave an environment that requires you to use your memory abilities, it is very easy to sit back and relax because others will not place high memory demands on you. However, by not challenging your mind, you may no longer be able to meet a challenge when one comes. A low self-concept can lead to a reduction in intellectual stimulation because you don't seek it out and this in turn will end up causing memory difficulties since you are not using your memory. Think of your memory as a muscle that must retain flexibility and strength. Without regular exercise, it won't work well for you when you need it. Remember resting is rusting!

Educational Handout #4: Self-Change Skills

Everyone has certain behaviors that they wish they did more or less often. Usually when we don't behave how we like or as consistently as we like, we end up feeling miserable. The skill of self-control can be used to tackle these problems. Unlike will power, self-control is a skill that you can learn in order to make changes in your life. To be successful, self-change requires that 1.) you believe that you can change, 2.) you recognize self-change is a skill that can be learned, and 3.) you develop a plan of action. There are 6 steps for making a self-change plan of action:

1. Pinpoint the behavior that you want to change. It may be a desirable behavior that you want to do more consistently or a negative behavior that you want to do less often.

2. Find out where you are at. How often do you do this behavior and in what situations do you do it? You need to know this in order to set reasonable goals for yourself.

3. Look for any people and situations that make you more likely to perform or not to perform this behavior. If it is a behavior you are trying to avoid, avoiding people or situations associated with that behavior will make the problem behavior less likely to occur in the future.

If it is a behavior that you want to increase, being with people or situations that are associated with that desired behavior can lead to greater consistency in the behavior's expression. For example, if you want to get fit by taking a long walk every day, do it with other people who also want to take long walks. Each of the "group members" can help motivate the other members to take walks regularly. In addition to being more consistent

with this behavior, it will now be a fun activity rather than just anther task to be completed. This will lead to practicing your desired behavior more consistently.

4. Look for the consequences of the behavior you want to change. How do you feel about yourself and how do others feel about you when you do this behavior? If you want to decrease a behavior you don't want it to be followed by a positive experience that will make you more likely to do that behavior in the future.

However, if you have a behavior you desire to do more often, receiving positive support from yourself and others when you do this behavior will make you more likely to do that behavior in the future.

5. Set a goal for yourself. How often do you want to do this behavior per day or week? Do you want to do this behavior more or less often in certain situations or around certain people? Use these questions to set reasonable and specific goals for yourself.

6. Reward yourself when you accomplish your goals but not when you fall short of them. Also, make sure you choose a reward that is meaningful to you.

Handout #5: Pleasant Activities and Depression

1. The number of pleasant activities that you engage in is related to your mood. Such activities can be divided into 3 areas:

1a. Pleasant Social Interactions: These are interactions with others that feel positive and pleasurable. For example, when you have a nice conversation with friends.

1b. Competency Experiences: These are experiences that make us feel skilled or competent. For example, when you do something well.

1c. Incompatible Responses: These are activities that are incompatible with feeling depressed. For example, when you laugh or when you sleep well.

2. If the number of pleasant activities falls below a certain level, your mood is likely to become more depressed.

3. It is important to have a balance between neutral or unpleasant activities and pleasant activities. If you do keep a balance, this can keep your memory functioning better because your mood will be better.

4. Some problems you may have in carrying out a Pleasant Activities Plan are:

Problem #1: You may have to do some unpleasant tasks that need to be done but end up going over into the time you have scheduled for a pleasant activity.

Solution #1: Use time management. Plan tasks so they are started soon enough so they do not run into your time for pleasant activities.

Problem #2: Someone you do the activity with moves away.

Solution #2: Work on finding another pleasant activity to do.

Problem #3: You become filled with anxiety and discomfort when you do a pleasant activity.

Solution #3: Find out why you are tense or nervous and fix it.

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Educational Handout #6: Positive Thinking

A. Some thoughts on positive thinking:

1. Your thoughts can influence your mood.

2. Thoughts seem like they are automatic but they are under your control. You must

learn to become aware of your thoughts and take them seriously.

3. If you have a tendency to have negative thoughts about yourself, this can cause you to

become depressed. If you become depressed, your memory will also suffer.

4. How you think about yourself and how you feel are related. Sometimes how you think

causes you to feel a certain way.

You can use your thoughts to help you, however. For example:

1. Your thoughts can be used to turn your dreams into real-life goals.

2. Your thoughts can help you to pay attention better.

3. You can use your thoughts to make your memory better.

4. You can use your thoughts to help you see problems ahead of time. This can give you

time to think of a solution.

5. Your thoughts can keep you calm and on track with your life.

6. Your thoughts can help "get you going;" that is, they can motivate you to do

something.

How to Reduce Negative Thoughts:

1. Stop those negative thoughts:

       1a. Yell "STOP" when you have a negative thought. Then say it to yourself in

your head a few times.

1b. Say "I am not going to say that now" when you have a negative thought.

Then say it to yourself in your head a few times.

1c. Wear a rubber band on your wrist and snap it whenever you think a negative

thought.

2. Set aside a time to worry: If you need to think about certain negative thoughts, then

schedule a time to do so for no more than 30 minutes per day. Only allow yourself to

have negative thoughts during that time.

3. Exaggerate: Make your negative thoughts look foolish. For example, exaggerate how

bad the problem you are having negative thoughts is.

C. How to increase your positive thoughts:

1. Notecards: Carry 3x5 cards with positive statements about yourself on them. For

example, "I am quite good at..."

2. Habits: Develop the habit of thinking positive thoughts when you do certain behaviors.

The best behaviors to use are those that occur frequently. For example, say positive

thoughts as you brush your teeth or clean the dishes.

3. Notice what you accomplish: Notice what you accomplish rather than what you do not

accomplish by making a list of daily successes. For example, getting to an appointment on

time.

4. Give yourself rewards: Reward yourself for positive thoughts. For example, when you

think, "I did a good job on that," give yourself an item you enjoy.

5. Think of any easier times to come: Think of a time in the near-future when things will be easier for you. It is O.K.. to feel down. Feeling down gets bad when you lose all hope. This will lead you to feeling depressed and it will cause your memory to get worse.

D. Guidelines for Positive Thinking

1. Pay attention to the situations where you seem to have negative thoughts.

2. See if there are any good things you get for having negative thoughts, especially around others. For example, are people nicer to you?

3. Do you punish yourself for thinking positive thoughts? Do you think of yourself as self-centered or conceited for thinking positive thoughts about yourself?

4. Keep track of words that lead to negative thoughts such as "I should have...I must...This is awful...This is terrible...I will never."

5. Use words that can lead to positive talk such as "I wish" or "I would have preferred"

When you have negative thoughts, you can also:

1. Prove to yourself how those thoughts don't make any sense. Give yourself examples of how those negative thoughts are incorrect.

2. Replace "should" and "ought" thoughts with "Why should I?"

3. Change words like "terrible" and "awful" to "I would have liked to..., but is it really terrible?"

4. Change words like "I will always be like this" with words like, "Just because this time it happened..., does it really mean always?"

Educational Handout #7: Assertiveness

Assertiveness gives you the ability to express your thoughts and feelings openly:

1. It can help develop close, warm relationships with others.

2. It can prevent an unpleasant encounter.

3. It can give you the means for obtaining more positive responses from others.

4. It allows other people to understand you better.

These can all keep you from becoming depressed. This is important since depression can affect your memory. When you become depressed, it is harder to remember most things. Only sad things are remembered easier. As a matter of fact, that is about all you can remember. This in turn will make you even more depressed and your memory even worse.

How to become assertive:

1. Develop a personal problem list of 5 problems that meet the following criteria:

    1a. A situation that you are currently handling in a non-assertive way.

    1b. A situation that occurs regularly in your life.

    1c. A situation that is troubling you.

    1d. A situation that is not too specific or general.

2. Monitor your assertiveness:

Track your amount of assertiveness and level of comfort in your problem situation. Use a scale from 0 to 5. For assertiveness, 0 means you were not assertive at all and 5 means you were very assertive. For comfort, 0 means you feel unpleasant and 5 means you feel very comfortable with how you handled the situation.

3. **Practice assertive imagery:**

3a. The goal is to handle situations as well as you can and to feel good about how you handled them.

3b. Start with easy situations

3c. Transfer from imagery to real life once you are comfortable with how you handled it in your mind.

Educational Handout #8: Maintaining Your Memory Power

The following points are important to consider if you want to get the most out of the course and really improve your memory power.

1. Just reading these handouts about memory won't cause your memory to improve. It's like reading an exercise book. Your body won't get in shape, no matter how good the book is, without doing the exercises.

2. Also, a one day memory workout will not permanently improve your memory either. It is just like a crash diet. Just as you gain back the weight because you haven't changes your eating habits, so will you also fall back on your old memory techniques, even though they may not be as good.

3. Only deliberate and regular practice of these techniques will lead to memory improvement. To change your memory permanently, you must make these strategies a routine part of your everyday life.

4. When you become skilled in the use of these strategies, they will become a natural part of your daily interaction with the world. You won't have to devote any conscious mental energy to figure out how to apply a strategy. You will be able to use these strategies automatically without giving them any thought. Remember, well-learned strategies are not likely to be forgotten as you get older.

The best way to practice the memory strategies that we showing you is to:

1. Pick a strategy that you are interested in or one that you would like to be able to do better.

2. Use it for simple memory tasks. For example, to do 3 errands, or to remember 2 names, or to remember a news item you want to talk about.

3. Keep a list as a back-up strategy in case you forget. Do this especially when you are trying to remember something very important.

4. Practice regularly.

5. Keep practicing the memory strategy until you feel confident in using it. Then try the memory strategy on harder tasks.

6. Use this method to practice other memory strategies.

Different ways to practice are:

1. Use a different strategy for each type of task. For example, use one type of memory strategy to learn the names of people in your building and another one for remembering your errands.

2. Use one type of memory strategy all day, no matter what the task. For example, you can use the same memory strategy to do errands, to buy groceries, to take your medicine, and so on. At the end of the day, look over your successes and failures.

3. Make an effort to remember 5 to 8 things each day.

4. Use simple memory strategies for simple tasks and complex strategies for harder tasks.

APPENDIX B

The Beck Depression Inventory

BDI™

Date: _____

Name: _____ Marital Status: _____ Age: _____ Sex: _____

Occupation: _____ Education: _____

This questionnaire consists of 21 groups of statements. After reading each group of statements carefully, circle the number (0, 1, 2 or 3) next to the one statement in each group which best describes the way you have been feeling the past week, including today. If several statements within a group seem to apply equally well, circle each one. Be sure to read all the statements in each group before making your choice.

1
0   I do not feel sad.
1   I feel sad.
2   I am sad all the time and I can't snap out of it.
3   I am so sad or unhappy that I can't stand it.

2
0   I am not particularly discouraged about the future.
1   I feel discouraged about the future.
2   I feel I have nothing to look forward to.
3   I feel that the future is hopeless and that things cannot improve.

3
0   I do not feel like a failure.
1   I feel I have failed more than the average person.
2   As I look back on my life, all I can see is a lot of failures.
3   I feel I am a complete failure as a person.

4
0   I get as much satisfaction out of things as I used to.
1   I don't enjoy things the way I used to.
2   I don't get real satisfaction out of anything anymore.
3   I am dissatisfied or bored with everything.

5
0   I don't feel particularly guilty.
1   I feel guilty a good part of the time.
2   I feel quite guilty most of the time.
3   I feel guilty all of the time.

6
0   I don't feel I am being punished.
1   I feel I may be punished.
2   I expect to be punished.
3   I feel I am being punished.

7
0   I don't feel disappointed in myself.
1   I am disappointed in myself.
2   I am disgusted with myself.
3   I hate myself.

8
0   I don't feel I am any worse than anybody else.
1   I am critical of myself for my weaknesses or mistakes.
2   I blame myself all the time for my faults.
3   I blame myself for everything bad that happens.

9
0   I don't have any thoughts of killing myself.
1   I have thoughts of killing myself, but I would not carry them out.
2   I would like to kill myself.
3   I would kill myself if I had the chance.

10
0   I don't cry any more than usual.
1   I cry more now than I used to.
2   I cry all the time now.
3   I used to be able to cry, but now I can't cry even though I want to.

11
0   I am no more irritated now than I ever am.
1   I get annoyed or irritated more easily than I used to.
2   I feel irritated all the time now.
3   I don't get irritated at all by the things that used to irritate me.

12
0   I have not lost interest in other people.
1   I am less interested in other people than I used to be.
2   I have lost most of my interest in other people.
3   I have lost all of my interest in other people.

13
0   I make decisions about as well as I ever could.
1   I put off making decisions more than I used to.
2   I have greater difficulty in making decisions than before.
3   I can't make decisions at all anymore.

_____ Subtotal Page 1

CONTINUED ON BACK

14	0	I don't feel I look any worse than I used to.	**19**	0	I haven't lost much weight, if any, lately.
	1	I am worried that I am looking old or unattractive.		1	I have lost more than 5 pounds.
	2	I feel that there are permanent changes in my appearance that make me look unattractive.		2	I have lost more than 10 pounds.
	3	I believe that I look ugly.		3	I have lost more than 15 pounds.

14

0   I don't feel I look any worse than I used to.

1   I am worried that I am looking old or unattractive.

2   I feel that there are permanent changes in my appearance that make me look unattractive.

3   I believe that I look ugly.

15

0   I can work about as well as before.

1   It takes an extra effort to get started at doing something.

2   I have to push myself very hard to do anything.

3   I can't do any work at all.

16

0   I can sleep as well as usual.

1   I don't sleep as well as I used to.

2   I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.

3   I wake up several hours earlier than I used to and cannot get back to sleep.

17

0   I don't get more tired than usual.

1   I get tired more easily than I used to.

2   I get tired from doing almost anything.

3   I am too tired to do anything.

18

0   My appetite is no worse than usual.

1   My appetite is not as good as it used to be.

2   My appetite is much worse now.

3   I have no appetite at all anymore.

19

0   I haven't lost much weight, if any, lately.

1   I have lost more than 5 pounds.

2   I have lost more than 10 pounds.

3   I have lost more than 15 pounds.

I am purposely trying to lose weight by eating less. Yes _____ No _____

20

0   I am no more worried about my health than usual.

1   I am worried about physical problems such as aches and pains; or upset stomach; or constipation.

2   I am very worried about physical problems and it's hard to think of much else.

3   I am so worried about my physical problems that I cannot think about anything else.

21

0   I have not noticed any recent change in my interest in sex.

1   I am less interested in sex than I used to be.

2   I am much less interested in sex now.

3   I have lost interest in sex completely.

_____ Subtotal Page 2

_____ Subtotal Page 1

_____ Total Score

APPENDIX C

APPENDIX C

The Memory Assessment Clinic Self Report Scale

Memory Assessment Clinics, Inc.

Self-Rating Scale

MAC-S

(R-1)

On this form we ask you to describe your memory ability in a variety of situations in everyday life. In some cases you may not have experienced the exact situation described. In such cases, please give your impression of how well you would remember.

For each of the situations below, think about how you would describe your memory, as compared to other people. Please use the five-point scale at the right to record your answer.

How would you describe your ability to remember the following?

	Very poor	Poor	About average	Good	Very good
1. The name of a person just introduced to you	[1]	[2]	[3]	[4]	[5]
2. Telephone numbers or zip codes that you use on a daily or weekly basis	[1]	[2]	[3]	[4]	[5]
3. Specific facts from a newspaper or magazine article you have just finished reading	[1]	[2]	[3]	[4]	[5]
4. To turn out lights, turn off appliances, and lock doors when leaving home	[1]	[2]	[3]	[4]	[5]
5. Gifts you have received at holidays during the past several years	[1]	[2]	[3]	[4]	[5]
6. Facts that must be recalled very quickly as in a game or television game show	[1]	[2]	[3]	[4]	[5]
7. The date and day of the week	[1]	[2]	[3]	[4]	[5]
8. Details of holidays or special occasions of your childhood	[1]	[2]	[3]	[4]	[5]
9. Addresses of close family members, friends, or associates	[1]	[2]	[3]	[4]	[5]
10. Verbal directions to a geographic location given minutes earlier	[1]	[2]	[3]	[4]	[5]
11. To write letters you intend to write or make telephone calls you intend to make	[1]	[2]	[3]	[4]	[5]

How would you describe your ability to remember the following?

	Very poor	Poor	About average	Good	Very good
12. Meanings of words that you use only rarely	[1]	[2]	[3]	[4]	[5]
13. Telephone numbers or zip codes that you use on a monthly basis or less often	[1]	[2]	[3]	[4]	[5]
14. Details of family events that occurred during the past year	[1]	[2]	[3]	[4]	[5]
15. Which door you entered when shopping in a large department store or mall	[1]	[2]	[3]	[4]	[5]
16. To take along, when leaving the home or office, any items that you intended to take (for instance, an umbrella or a letter to mail)	[1]	[2]	[3]	[4]	[5]
17. How to reach a geographic location you have visited once or twice	[1]	[2]	[3]	[4]	[5]
18. Meanings of words you once knew very well	[1]	[2]	[3]	[4]	[5]
19. What you read in the newspaper one day ago	[1]	[2]	[3]	[4]	[5]
20. Who was with you at events attended weeks or months ago.	[1]	[2]	[3]	[4]	[5]
21. Where you have put objects (such as keys) in the home or office	[1]	[2]	[3]	[4]	[5]
22. In general, as compared to the average individual, how would you describe your memory?	[1]	[2]	[3]	[4]	[5]

In this part of the form a number of everyday memory problems that people report are described and in each case you are asked to indicate how often you experience the problem. As in Part I, please carefully mark the box that best describes your response.

How often would you say that you do each of the following?

	Very often	Often	Occasionally	Rarely	Very rarely
23. Go into a room to get something and forget what you are after	[1]	[2]	[3]	[4]	[5]
24. Forget to bring up an important point you had intended to mention during a conversation	[1]	[2]	[3]	[4]	[5]
25. Forget that you told someone something and tell that person the same thing again	[1]	[2]	[3]	[4]	[5]
26. Have difficulty recalling a word you wish to use	[1]	[2]	[3]	[4]	[5]
27. Have to stop and think when distinguishing right from left	[1]	[2]	[3]	[4]	[5]
28. Forget an entire event, such as attending a party or having a visitor	[1]	[2]	[3]	[4]	[5]
29. Miss the point someone else is making during a conversation	[1]	[2]	[3]	[4]	[5]
30. Feel that a word or name you want to remember is "on the tip of your tongue" but cannot be recalled	[1]	[2]	[3]	[4]	[5]
31. Forget the name of a familiar object	[1]	[2]	[3]	[4]	[5]

How often would you say that you do each of the following?

	Very often	Often	Occasionally	Rarely	Very rarely
32. Call someone you recently met by the wrong name	[1]	[2]	[3]	[4]	[5]
33. Fail to remember a name or word when trying, but recall it later	[1]	[2]	[3]	[4]	[5]
34. Dial a number and forget whom you were calling before the phone is answered	[1]	[2]	[3]	[4]	[5]
35. Forget an appointment or other event that is very important to you	[1]	[2]	[3]	[4]	[5]
36. Take a surprisingly long time to recall a fact that you know quite well (and do eventually remember)	[1]	[2]	[3]	[4]	[5]
37. Have difficulty following a conversation when there are distractions in the environment such as noise from a TV or a radio	[1]	[2]	[3]	[4]	[5]
38. Forget which waiter took your order in a restaurant	[1]	[2]	[3]	[4]	[5]
39. Have to re-read earlier paragraphs from a newspaper or magazine story to understand the point	[1]	[2]	[3]	[4]	[5]
40. Pass the point where you intended to exit while driving a car or taking public transportation	[1]	[2]	[3]	[4]	[5]
41. Fail to recognize people who recognize you	[1]	[2]	[3]	[4]	[5]
42. Have trouble finding your place again when interrupted in reading	[1]	[2]	[3]	[4]	[5]
43. Arrive at the grocery store or pharmacy and forget what you intended to buy	[1]	[2]	[3]	[4]	[5]
44. Meet people who seem familiar but can't remember where you met them	[1]	[2]	[3]	[4]	[5]
45. Confuse one word with another when they sound the same	[1]	[2]	[3]	[4]	[5]
46. Store an important item in a place where it will be safe and then forget where it is	[1]	[2]	[3]	[4]	[5]

Please use the five point scale at the right to answer the following question.

	Much worse	Somewhat worse	About the same	Somewhat better	Much better
47. How would you describe your memory, on the whole, as compared to the best it has ever been?	[1]	[2]	[3]	[4]	[5]

Please use the five point scale at the right to answer the following question.

43. Compared to the best your memory has ever been, how would you describe the speed with which you now remember things?

Much slower	Somewhat slower	About the same	Somewhat faster	Much faster
[1]	[2]	[3]	[4]	[5]

Please use the five point scale at the right to answer this final question.

49. How much concern or distress do you feel about your memory at this time?

Very serious concern	Considerable concern	Moderate concern	Mild concern	No concern
[1]	[2]	[3]	[4]	[5]

Memory Assessment Clinics, Inc. Self-rating Scale
Summary Sheet

ABILITY ITEMS:

I.   Remote Personal Memory   IV. Word Recall/Semantic Memory
5.   ____   3.   ____
8.   ____   12. ____
14. ____   19. ____
20. ____   Total = ____   Total = ____

II. Numeric Recall   V.   Spatial/Topographic Memory
1.   ____   10. ____
2.   ____   15. ____
9.   ____   17. ____
13. ____   Total = ____   Total = ____

III. Everyday Task Oriented Memory   ABILITY TOTAL = ____
4.   ____
11. ____
16. ____
21. ____   Total = ____

FREQUENCY OF OCCURRENCE ITEMS:

I.   Word & Fact Recall/Semantic Memory IV. General Forgetfulness
29. ____   27. ____
30. ____   34. ____
31. ____   35. ____
33. ____
36. ____   Total = ____   Total = ____

II. Attention & Concentration   V.   Facial Recognition
28. ____   38. ____
37. ____   41. ____
39. ____   44. ____
42. ____
45. ____   Total = ____   Total = ____

III. Everyday Task Oriented Memory   FREQUENCY OF
23. ____   OCCURRENCE TOTAL = ____
24. ____
43. ____
46. ____   Total = ____

GLOBAL MEMORY COMPLAINT ITEMS:
22. ____
47. ____
48. ____
40. ____

Crook, T. H., & Larrabee, G. J. (1992). Normative data on a self-rating scale
     for evaluating memory in everyday life. Archives of Clinical Neuro-
     psychology, 7, 41-51.

MMM/109.1

APPENDIX D

The California Verbal Learning Test

LIST A
(Monday
List)

drill
plums
vest
parsley
grapes
paprika
sweater
wrench
chives
tangerines
chisel
jacket
nutmeg
apricots
pliers
slacks

LIST A: Immediate Free Recall, Trials 1-3

Instructions to Examinee:

Trial 1:

Let's suppose you were going shopping on Monday. I'm going to read a list of items for you to buy. Listen carefully, and when I'm through, I want you to say back as many of the items as you can. It doesn't matter what order you say them in — just tell me as many as you can. Are you ready?

Trial 2:

I'm going to repeat Monday's shopping list. Again, I want you to say back as many items as you can, in any order. Be sure to also say the items on the list that you told me the first time.

Trials 3-5:

I'm going to repeat Monday's shopping list. Again, I want you to say back as many items as you can, in any order, including items you may have already told me.

**KEY FOR CODING
RESPONSE TYPE**

C = Correct
P = Perseveration
I = Intrusion

	Trial 1 Responses	Type	Semantic Cluster		Trial 2 Responses	Type	Semantic Cluster		Trial 3 Responses	Type	Semantic Cluster
1				1				1			
2				2				2			
3				3				3			
4				4				4			
5				5				5			
6				6				6			
7				7				7			
8				8				8			
9				9				9			
10				10				10			
11				11				11			
12				12				12			
13				13				13			
14				14				14			
15				15				15			
16				16				16			
17				17				17			
18				18				18			
19				19				19			
20				20				20			

LIST A: Immediate Free Recall, Trials 4 & 5

Trial 4 Responses	Type	Semantic Cluster
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Trial 5 Responses	Type	Semantic Cluster
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Table of Free-Recall Word Order

LIST A (Monday List)	Immediate					Short Delay	Long Delay
	1	2	3	4	5		
drill							
plums							
vest							
parsley							
grapes							
paprika							
sweater							
wrench							
chives							
tangerines							
chisel							
jacket							
nutmeg							
apricots							
pliers							
slacks							
Serial cluster score:							

Summary Table: LIST A (Monday List) Immediate Free Recall

TRIAL	Correct (C)	Perseverations (P)	Intrusions (I)	Semantic Cluster
1				
2				
3				
4				
5				
TOTAL				

Record these totals in the Summary Table of Recall Errors (p. 9)

Table of Serial Position Recall: LIST A Immediate Free Recall, Trials 1-5

Region	Number Correct	Percent of Total
Primacy		
Middle		
Recency		
TOTAL		100%

LIST B
(Tuesday List)

Instructions: *Now let's suppose that you planned to go shopping again on Tuesday. I'm going to read a **new** list of items for you to buy. When I'm through, I want you to say back as many as you can, in any order.*

LIST B (Tuesday List)	Recall Order	Responses		Type	Semantic Cluster
toaster		1			
cherries		2			
halibut		3			
ginger		4			
pineapple		5			
spatula		6			
oregano		7			
flounder		8			
sage		9			
lemons		10			
cod		11			
skillet		12			
peaches		13			
salmon		14			
cinnamon		15			
bowl		16			
		17			
		18			
		19			
		20			

Correct (C): _____

Perseverations (P): _____

Intrusions (I): _____

Semantic cluster score: _____

Serial cluster score: _____

LIST A:
Short-Delay Free Recall

Instructions: *Now I'd like you to tell me all of the shopping items you can from the Monday list.*

Responses		Type	Semantic Cluster
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Correct (C): _____

Perseverations (P): _____

Intrusions (I): _____

Semantic cluster score: _____

LIST A:
Short-Delay Cued Recall

Instructions: *Tell me all of the shopping items from the Monday list that are:* (category)

Responses	Type
Spices & Herbs:	
Tools:	

Responses	Type
Fruits:	
Clothing:	

Correct (C):	_____
Perseverations (P):	_____
Intrusions (I):	_____

Time of day Short-Delay
    Cued Recall completed: _____

LIST A:
Long-Delay Free Recall

Time of day Long-Delay Free
   Recall begun: _____

Time of day Short-Delay Cued
   Recall completed: _____

Total delay: _____

   (Note The total delay should be about 20 minutes)

Instructions: *I read some shopping items
to you earlier. I'd like you to tell me all the
items you can from the Monday list—that was
the first list, the one that I read to you five
times. Go ahead.*

	Responses	Type	Semantic Cluster
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Correct (C):   _____

Perseverations (P):   _____

Intrusions (I):   _____

Semantic cluster score: _____

LIST A:
Long-Delay Cued Recall

Instructions: *Tell me all of the shopping items from the Monday list that are:* (category)

Responses	Type
Clothing:	
Fruits:	

Responses	Type
Tools:	
Spices & Herbs:	

Correct (C): _____

Perseverations (P): _____

Intrusions (I): _____

Summary Table of Recall Errors

Error Type	List A, Tr. 1-5 Total	List B	Short-Delay Recall Free	Cued	Long-Delay Recall Free	Cued	Total
Perseverations							
Intrusions: Free Recall				■		■	
Cued Recall	■	■			■		

LIST A:
Long-Delay Recognition

Instructions: *I'm going to read a list of shopping items. After I read each item, say "Yes" if the item was from the Monday list, and say "No" if it was not.*

(Note: For each "Yes" response, place a (✓) in the one blank space to the right of the word; for each "No" response, leave the space blank.)

A	= List A Correct (Hits)
BS	= List B-Shared
BN	= List B-Nonshared
NP	= Neither List Prototypical
PS	= Neither List Phonemically Similar
UN	= Neither List Unrelated

ITEM	A	BS	BN	NP	PS	UN
Sweater						
Oregano						
Flounder						
Rug						
Tires						
Pepper						
Jacket						
Aspirin						
Wax						
Drill						
Apricots						
Spatula						
Cherries						
Drums						
Chives						
Film						
Chisel						
Briefcase						
Pastry						
Tangerines						
Clock						
Shoes						
Grapes						
Salmon						
Paprika						
Racket						
Ginger						
Slacks						
Books						
Parsley						
Vest						
Apples						
Grill						
Plums						
Wrench						
Lemons						
Tapes						
Vitamins						
Pliers						
Bowl						
Hammer						
Nutmeg						
Chimes						
Soap						

TOTAL						
POSSIBLE	16	4	4	4	8	8
	A	BS	BN	NP	PS	UN

Total number of hits: _____

Total number of false positives: _____

Misses = 16 – Hits = _____

Discriminability:

$$(1 - \frac{\text{False Positives} + \text{Misses}}{44}) \times 100$$

$$= (1 - \underline{\hspace{1cm}}) \times 100 = \underline{\hspace{1cm}}$$

Response Bias:

$$\frac{\text{False Positives} - \text{Misses}}{\text{False Positives} + \text{Misses}} = \underline{\hspace{1cm}}$$

Note: If False Positives = 0 or Misses = 0, substitute a value of 1 when computing Response Bias.

APPENDIX E

The Rivermead Behavioral Memory Test

RBMT

TVTC
Thames Valley
Test Company

The Rivermead
behavioural memory test

Procedural guide and scoring sheet

- This scoring sheet provides a summary procedure to ensure that the test is consistently carried-out in the correct order.

- Please follow the instructions in the Manual for detailed procedural and scoring guidance.

Subject and test details

Name

Date of birth

Date of test

Assessment   1   2   3   4

Version   A (Red)   B (Blue)   C (Green)   D (Brown)

• 1 and 2 First and Second Name
Action
Present the portrait for 'Remembering a name'.
A Catherine Taylor
B Henry Fisher
C Pauline Roberts
D Philip Goodwin

• 3 Belonging
Action
Hide a belonging for 'Remembering a hidden belonging'.
A Desk drawer
B Cupboard
C Filing cabinet
D Brief case or bag

• 4 Appointment
Action
Set the timer for 'Remembering an appointment'.
A 'When do I have to see you again?'
B 'When does this session end?'
C 'When will I know the results of the test?'
D 'What time do we finish today?'

• 5 Pictures
Action
Present the ten presentation cards for 'Picture recognition'.

• 6a Story (immediate)
Action
Read the prose passage from the separate Story Sheet. Then ask the subject to recall the prose passage.
Response
Adopt your own technique (e.g. underlining and encircling) for recording each of the 21 'ideas' correctly recalled or partially recalled against the appropriate passage on the Story Sheet.
Scoring
Scoring is based on points awarded for the number of 'ideas' correctly recalled. You should therefore count and calculate after the test has been completed.

—— Raw Score
Each 'idea' recalled word-perfect
—— or using a close synonym = 1
Each 'idea' partially recalled,
or recalled with approximate
synonym = ½
(Maximum = 21)

Standardised Profile Score			
Raw Score	≤3.5	4–5.5	≥6
Standardised Profile Score	0	1	2

Screening Score
Score later

• 5 Pictures
Action
Present the 20 recognition cards for 'Picture recognition'.
Response
Tick each picture identified correctly. (Those pictures which were previously presented are indicated by superior figures on the reverse of the picture cards.)

1	2	3	4	5	6	7	8	9	10

Total

Record the number of false positives

Scoring

—— Raw Score
Subtract the number of false positives from the
—— total number of pictures correctly identified
(Maximum = 10)

Standardised Profile Score			
Raw Score	≤8	9	10
Standardised Profile Score	0	1	2

— Screening Score
All ten pictures identified correctly with no
— false positives = 1
(Otherwise = 0)

• 7 Faces
Action
Present the five presentation cards for 'Face recognition'.

• 8a Route (immediate)
Action
Demonstrate the route for 'Remembering a short route' (immediate). (Leave the 'Message' envelope for 'Remembering to deliver a message' at the location marked by an asterisk below.) Then ask the subject to reproduce the route. Record each of the stages reproduced correctly below. The subject's response to 'Remembering to deliver a message' should be recorded in the next section.
Response
Tick each stage of the route correctly recalled:

A Chair	door	window	table*	chair
B Door	window*	table	chair	door
C Window	table	chair*	door	window
D Table	chair	door*	window	table

Scoring

☐ *Raw Score*
Total number of stages recalled correctly
(Maximum = 5)

☐ *Standardised Profile Score*
Raw Score   ≤3   4   5
Standardised Profile Score   0   1   2

◯ *Screening Score*
All five stages of the route recalled in the correct order = 1
(Otherwise = 0)

• 9a Message (immediate)
Action
When demonstrating the route, leave the 'Message' envelope for 'Remembering to deliver a message' (immediate) at the location marked by an asterisk above.
Response
Tick as appropriate:

'Message' envelope picked-up spontaneously	☐
picked-up after prompt	☐
left at correct location	☐

Scoring

☐ *Raw Score*
'Message' picked-up spontaneously = 2
     picked-up after prompt = 1
     left at correct location = another 1
(Maximum = 3)

Standardised Profile Score
Score later

Screening Score
Score later

• 7 Faces
Action
Present the ten recognition cards for 'Face recognition'.
Response
Tick each face identified correctly. (Those faces which were previously presented are indicated by superior figures on the reverse of the face cards.)

1	2	3	4	5

Total ☐

Record the number of false positives ☐

Scoring

☐ *Raw Score*
Subtract the number of false positives from the total number of faces correctly identified
(Maximum = 5)

☐ *Standardised Profile Score*
Raw Score   ≤3   4   5
Standardised Profile Score   0   1   2

◯ *Screening Score*
All five faces identified correctly with no false positives = 1
(Otherwise = 0)

• 10 and 11 Orientation and Date
Action
Ask the ten questions for 'Orientation' and 'Date' in the order given below:
Response
Record the subject's responses in the spaces provided:

1 Year	2 Month	3 Day of week

4 Date	5 Place	6 City or town

7 Age	8 Year born	9 Prime Minister

10 President

Scoring

☐ *Raw Score*
Score one point for each correct response.
• Total number of correct responses to Orientation questions i.e. excluding Date
(Maximum = 9)

☐ • Correct Date
(Maximum = 1)

☐ *Standardised Profile Score*
• Orientation questions
Raw Score   ≤7   8   9
Standardised Profile Score   0   1   2

• Date

Raw Score	≤ Two days out	One day out	Correct
Standardised Profile Score	0	1	2

Screening Score
• Orientation questions
All nine Orientation questions answered
   correctly = 1
(Otherwise = 0)
• Date
Correct Date given = 1
(Otherwise = 0)

• 4 Appointment

Action
Engage the subject in conversation until the timer
sounds for 'Remembering an appointment'. Prompt
if necessary.
A 'When do I have to see you again?'
B 'When does this session end?'
C 'When will I know the results of the test?'
D 'What time do we finish today?'
Response
Tick as appropriate:
Subject asked appropriate question spontaneously ☐

              after prompt ☐

  Subject remembered that something had to
  be asked but could not remember what it was ☐

Scoring

☐ *Raw Score*
Subject asked appropriate question
   spontaneously = 2
   after prompt = 1
Subject remembered that something had to be
   asked but could not remember what it was = 1
(Maximum = 2)

☐ *Standardised Profile Score*

Raw Score	0	1	2
Standardised Profile Score	0	1	2

○ *Screening Score*
Appropriate question asked without prompt
   when timer sounded = 1
(Otherwise = 0)

• 6b Story (delayed)

Action
Ask the subject to recall the prose passage for 'Delayed
prose recall'. Give opening prompt if necessary.
Response
Record each of the 'ideas' correctly recalled or partially
recalled against the appropriate passage on the Story
Sheet.
Scoring
Score exactly as for 'Immediate prose recall' *but
deduct one point if the subject needed an opening
prompt.*

☐ *Raw Score*
Each 'idea' recalled word-perfect
   or using a close synonym = 1
Each 'idea' partially recalled,
   or recalled with approximate
   synonym = ½
(Maximum = 21)

☐ *Standardised Profile Score*

Raw Score	≤1.5	2-3.5	≥4
Standardised Profile Score	0	1	2

○ *Screening Score*
If the subject recalled at least six 'ideas' on
   'Story (immediate)' and at least four 'ideas'
   on 'Story (delayed)' = 1
(Otherwise = 0)

• 8b Route (delayed)

Action
Ask the subject to reproduce the route for 'Remem-
bering a short route' (delayed). Record each of the
stages reproduced correctly below. The subject's
response to 'Remembering to deliver a message'
(delayed) should be recorder in the next section.
Response
Tick each stage of the route correctly recalled:
A Chair   door   window   table*   chair
B Door   window*   table   chair   door
C Window   table   chair*   door   window
D Table   chair   door*   window   table

Scoring

☐ *Raw Score*
Total number of stages recalled correctly
(Maximum = 5)

☐ *Standardised Profile Score*

Raw Score	≤3	4	5
Standardised Profile Score	0	1	2

○ *Screening Score*
All five stages of the route recalled in the
   correct order = 1
(Otherwise = 0)

• 9b Message (delayed)

Action
Remind the subject, if necessary, about the 'Message'
envelope for 'Remembering to deliver a message'
(delayed). The location is marked by an asterisk above.
Response
Tick as appropriate:
'Message' envelope picked-up spontaneously ☐

       picked-up after prompt ☐

       left at correct location ☐

Scoring

☐ *Raw Score*
'Message' picked-up spontaneously = 2
       picked-up after prompt = 1
       left at correct location = another 1
(Maximum = 3)

Standardised Profile Score
The Standardised Profile Score for 'Remembering to deliver a message' is based on the sum of the Raw Scores obtained for the immediate and delayed recalls (therefore maximum Raw Score = 6).

Sum of Raw Scores	≤4	5	6
Standardised Profile Score	0	1	2

Screening Score
If the subject spontaneously picked-up the 'Message' envelope and left it at the correct location in the immediate and delayed recalls = 1
(Otherwise = 0)

• 1 and 2 **First and Second Name**

Action
Re-present the portrait for 'Remembering a name'.
Give first letter prompt if necessary.

A Catherine Taylor
B Henry Fisher
C Pauline Roberts
D Philip Goodwin

Response
Tick as appropriate

First Name   recalled without prompt ☐

            recalled with prompt ☐

Second Name recalled without prompt ☐

            recalled with prompt ☐

Scoring

Raw Score
• First Name   recalled without prompt = 2
            recalled with prompt = 1
(Maximum = 2)

• Second Name recalled without prompt = 2
            recalled with prompt = 1
(Maximum = 2)

Standardised Profile Score
The Standardised Profile Score for 'Remembering a name' is based on the sum of the Raw Scores obtained for the recall of the **First and Second Names** (therefore maximum Raw Score = 4).

Raw Score	≤2	3	4
Standardised Profile Score	0	1	2

Screening Score
• If the subject recalled the First Name without prompt = 1
(Otherwise = 0)
• If the subject recalled the Second Name without prompt = 1
(Otherwise = 0)

• 3 **Belonging**

Action
Inform the subject that 'We have finished this test'.
Wait for recall of 'Remembering a hidden belonging'.
Prompt if necessary.

A Desk drawer
B Cupboard
C Filing cabinet
D Brief case or bag

Response
Tick as appropriate:

Place recalled without prompt ☐

       recalled with prompt ☐

Item recalled without prompt ☐

       recalled with prompt ☐

Scoring

Raw Score
Place recalled without prompt = 2
     recalled with prompt = 1
Item recalled without prompt = 2
     recalled with prompt = 1
(Maximum = 4)

Standardised Profile Score
Raw Score	≤2	3	4
Standardised Profile Score	0	1	2

Screening Score
If the subject spontaneously recalled the item and the place where it was hidden = 1
(Otherwise = 0)

Score summary	Standardised Profile Score (2,1 or 0)	Screening Score (1 or 0)
1 First Name	☐	◯
2 Second Name		◯
3 Belonging	☐	◯
4 Appointment	☐	◯
5 Pictures	☐	◯
6a Story immediate	☐	◯
6b delayed	☐	
7 Faces	☐	◯
8a Route immediate	☐	◯
8b delayed	☐	◯
9 Message (immediate & delayed)	☐	◯
10 Orientation (not including date)	☐	◯
11 Date	☐	◯
Total	☐ maximum = 24	◯ maximum = 12

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