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A STUDY OF MEMORY COMPLAINTS IN THE ABLE ELDERLY

By

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ABSTRACT

A STUDY OF MEMORY COMPLAINTS IN THE ABLE ELDERLY

By

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Many older adults complain of memory decline (Lowenthal, Berkman, Buehler, Pierce, Robbinson & Trier, 1967). Most empirical work, however, has demonstrated that memory complaints are not directly related to memory performance (e.g., Zelinski, Gilewski, & Schaie, 1993). This study addressed the influence of depression, physical health complaints, educational level, and premorbid levels of ability on subjective memory complaints among 130 community dwelling older adults (Mean age = 67.4). The impact of certain types of memory complaints and mood and memory training was also investigated. Depression and physical health complaints accounted for significant (p's < .001) proportions of the variance in memory complaints (R^2 = .15; R^2 = .10, respectively). Contrary to expectations, level of education did not relate to memory complaints. Consistent with previous research on general memory complaints, specific types of memory complaints (e.g. memory of names and faces) were not directly predictive of memory performance. However, when premorbid ability was taken into account a relationship between memory complaints and objective memory performance was demonstrated; difference scores accounted for more than 5% of the variance in Rivermead scores (R^2 = .05, p < .01, Beta = -.23, p < .01). Finally, treatment significantly reduced memory complaints ($t(81)$ = -3.78, p < .001).

To my Mom, Dad, and Matt for all their love and support.

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INTRODUCTION

According to recent population estimates, there are over 51 million people in the United States (21% of the total population) who are at least 55 years of age (US Bureau of Census, 1987 as cited in LaRue, 1992). By 2030, it is projected that one in every three Americans will be 55 years old or older. This age group is by far the fastest growing segment of the population (Tranel, Benton, & Olson, 1997). With the growing number of older adults, the importance of understanding aging and common disorders of later life is difficult to exaggerate.

An increasing number of healthy older adults are seeking advice and treatment for cognitive problems (La Rue, 1992). In particular, memory difficulties are often cited (Williams, Denney & Schadler, 1983). Memory decline with age has become such a common concern among older adults that researchers and clinicians who work with geriatric patients have recommended the development of a new diagnostic entity, "Age Associated Memory Impairment" (AAMI) to be included in the Diagnostic and Statistical Manual of Mental Disorders (Caine, 1993). The criteria proposed for AAMI includes both memory dysfunction and subjective complaints (Crook, Bartus, Ferris et al., 1986). Now this is more often called Age Consistent Memory Decline.

Generally, memory problems become more common with advancing age; for example, sensory memory (a kind of immediate registration like hearing someone's name once or looking at a photograph quickly) declines slightly with increasing age; older

adults were found to require longer exposure time to adequately register external stimulus than younger individuals (e.g., Cerella, Poon & Pozard, 1982). Age differences in long term memory have also been widely reported (La Rue, 1992). However, this trend does not generalize to all elderly adults (La Rue, 1992). In fact, many individuals in their sixties and seventies perform as well on memory measures as younger adults (La Rue, 1992). Since the findings are equivocal, it is important to consider individual differences such as gender, education, health, and affective status when studying memory functioning in older adults to evaluate their impact on memory functioning and memory problems.

An understanding of memory complaints is also essential because diagnosis and treatment decisions are in part based upon the amount and intensity of elders' memory complaints (Zarit, 1980). Fifty to eighty percent of older adults have subjective memory complaints (Lowenthal, Berkman, Buehler, Pierce, Robbinson and Trier, 1967). However, empirical work has also demonstrated that memory complaints are not directly related to memory performance (Kahn, Zarit, Hilbert & Niederehe, 1975; Rosavage, 1990; Zelinski, Gilewski, & Schaie, 1993, Popkin, Gallagher, Thompson et al., 1982; Bolla, Lindgren, Bonaccorsy, et al., 1991). The proposed diagnostic criteria for AAMI are dependent upon the presence of subjective complaints in addition to memory impairment. The variable relationship between memory complaints and objective performance has caused some to question this criterion (Caine, 1993).

One aim of this study was to look more closely at memory complaints, specifically the influence of affective status and, in particular depression, physical health, education, and premorbid functioning on memory complaints. This study also explored specific types

of memory complaints and their relation to objective performance. The observed weak relationship between self-reported memory and objective performance might also be a consequence of the type of questionnaire used. Most empirical work has examined global types of memory complaints. It has been suggested that a stronger relationship between self reported memory and objective performance might be found if specific types of memory beliefs; for example, memory of names and faces, were examined individually (Mischel, 1968). This study investigated the relationship between the various dimensions of subjective memory (i.e. the ten factors on the MAC-S; Winterling, Crook, Salama, & Grobert, 1986) and objective performance. Finally, this study determined if memory complaints could be decreased through treatment; participants also completed Mood and Memory training workshop groups. A great majority of research in the area of memory complaints to date has used clinical samples (Scogin, 1985). These samples are not representative of the population, and so the results might not be generalized. For example: depressed patients tend to complain more about memory problems. Thus, it was important that we examined the variables that influence memory complaints in normal healthy older adults in order to make appropriate diagnostic and treatment decisions. To further show the rationale underlying this study, we have included a review of the literature of memory complaints in the areas of depression, level of education, physical health, premorbid ability, self report measures and treatment.

Depression

Depression appears to play a role in the relationship between memory complaints and memory performance. Kahn, Zarit, Hilbert and Niederehe (1975) examined a group of

elderly adults diagnosed with late onset dementia. They found that individuals with mild dementia but with high reported levels of depression were more likely to complain about their memory than individuals who suffered more from severe dementia but were not depressed. Furthermore, Popkin, Gallagher, Thompson and Moore (1982) found that as depression remitted, memory complaints were significantly reduced. Gagon, Dartigues, Mazaux, Dequae, Letenneur, Giroire, and Barberger-Gateau (1994) conducted a survey of self-reported memory complaints and memory performance of 2,726 older adults living in the south-west of France. Those who scored above a threshold for depressive symptoms reported more problems with their memory.

Poitrenaud, Malbezin and Guez (1989) conducted a seven year longitudinal study to determine the relationship between age associated changes in memory test performance and self-ratings of memory abilities. Results demonstrated an age-associated decrease in memory test performance, but this objective impairment was not related to self-rating of memory. They suggested that complaints about memory performance by many aged participants reflect affective status more than actual decline in memory performance.

La Rue, Swan and Carmelli (1995) administered the Center for Epidemiological Studies Depression scale (CES-D) to 1,232 older adults. This measure is a 20-item self-report scale in which individuals are instructed to rate the frequency with which they experience particular thoughts and feelings. Participants also completed a three hour cognitive battery to assess level of memory functioning. In contrast to previous findings, La Rue et al. (1995) found a modest but consistent relationship between depressive symptoms and cognitive performance.

The results of these studies suggest that depression is an important component of memory complaints among elderly adults. However, most elderly adults are not clinically depressed. Pettinati, Magee, and Mathisen (1984) found that non-depressed elders reported significantly more problems in certain types of memory functions than did depressed elders. In another study White and Cunninghan (1984) found that depression was related to memory performance, but memory complaints and memory performance were not significantly correlated. Thus the findings with these samples were inconclusive.

The present study examined the effect of depression on memory complaints in a sample of able elderly. Depression was measured using the Beck Depression Inventory (BDI; Beck et al., 1961) and the Geriatric Depression Scale (GDS; Yesavage, Brink, Rose et al., 1983). Jones (1995) reported that when the GDS was used as a measure of depression in older adults, the correlation between depression and memory complaints was lower than the correlations reported in previous studies (e.g. Kahn, Zarit, Hilbert, & Niederehe, 1975). He suggested that the use of a depression measure such as the GDS, which measures mood related depression without a preponderance of vegetative/somatic symptom complaints, may have contributed to the smaller correlations between depression and subjective complaints and he recommended that future investigations utilize both types of measures of depression. This study used both the BDI (which taps into the vegetative/somatic symptoms of depression) and the GDS (which measures only the affective component of depression).

Physical Health

Individual differences in memory complaints can also be a consequence of difference in physical health. In a national survey of nearly 15,000 older adults, Cutler and Grams (1989) found that those reporting memory complaints were more likely to be in poor physical health and had more hearing and visual impairments than those individuals without memory complaints. In a study of 403 older adults, Hanninen, et al. (1994) found that individuals who had stronger tendencies toward somatic complaining and greater anxieties about physical health reported more memory complaints regardless of their objective performance. Collins and Abeles (1996) found a significant relationship between subjective memory complaints and somatic complaints (e.g., insomnia, pain, physical problems). The present study also examined the association of physical health, physical health complaints, and memory complaints.

Level of Education

Intelligence and level of education can also effect the amount and type of memory complaints experienced by older adults. Derouesne et al. (1989) did not find relationship between severity of memory complaints and educational level, but later studies have differed. The association between memory complaints and performance on standardized memory tests was examined by Bolla, Lindgren, Bonaccorsy, and Bleeker (1991). They found that individuals with higher levels of verbal intelligence reported fewer memory complaints, less forgetting, and placed less emphasis on forgetting. Bolla et al. (1991) also found that those with higher verbal intelligence were more likely to be well read and be better informed about the aging process and age related disorders. This knowledge may

help them to recognize everyday memory problems as parts of the normal aging process rather than signs of dementia. Gagon et al. (1994) examined the relationship between self-reported memory decline, demographic variables and memory performance in 2,726 adults living in the south-west of France. They found lower memory performance was related to both older age and lower levels of education. A significant relationship was detected between memory complaints and education; those reporting more memory complaints were from the lower educational group. Derouesne, Dealberto, Boyer, and Lubin (1993) reported similar findings; low educational status was predictive of cognitive complaints in a sample of 634 adults ages forty-five to seventy-five. Lamberty, Bieliauskas, Chatel, and Holt (1993) found that education accounted for a significant proportion of the variance (19%) in memory performance of a geriatric clinical sample. Many years of education might place an individual ahead of one's cohorts with respect to general cognitive abilities. They suggested that education might serve as a buffer against the effects of the dementing process and hence against decline that might manifest itself in the form of memory complaints.

This study examined the moderating effect of level of education on the relationship between self reported memory complaints and actual performance. Participants were asked to report the years of formal education that they have received.

Premorbid Ability

The questionable relationship between memory complaints and test performance might be a function of premorbid ability. Individuals with extremely high levels of premorbid functioning may experience declines that bring their current functioning down

to 'normal levels'. This decline may manifest itself in more memory complaints even though standard tests of memory ability may not reveal any evidence of decline. Measures of intelligence have been reported to predict memory performance well in elderly subjects (Rabbitt and Goward, 1986; Schlosser & Ivison, 1989). Christensen (1991) found that those who complained of memory problems were more likely than non-complainers to show a discrepancy between their current level of functioning and that which would be expected on the basis of their premorbid IQ. On the other hand, Jorm, Christensen, Henderson, Korten, Mackinnon & Scott (1994) found results that were inconsistent with those found by Christensen (1991) with a similar population. When premorbid estimates were factored in correlations between memory complaints and performance did not increase. Further investigation into this area seemed warranted.

Self-Report Memory Measures

The weak relationship observed between self-reported memory and objective performance might also be a consequence of the type of self report questionnaire used. The content and wording of items, the type of judgment required of the subject, scaling, and the number of dependent measures in a questionnaire can all effect the external validity of self report measures.

Self assessment of memory complaints is important for a number of reasons. Memory complaints provide valuable information about memory impairments. Reisberg, Ferris, Borenstein, Sinaiko, de Leon, and Buttinger (1986) reported that individuals with severe memory impairment tended to overestimate their memory abilities. The discrepancy

between patients' self-assessment of their memory ability and their actual performance may help differentiate a pathological processes from normal aging. In addition, patients' memory complaints might be an early warning sign of dementia (Gilewski & Zelinski, 1986). Memory complaints are also part of the diagnostic criteria for Age Associate Memory Impairment (AAMI).

Self-reported memory might also be useful in the identification of depression in older adults. Complaints about ability without evidence of performance deficits may be an indicator of depression. Depressed people are thought to complain more about their memory ability than those who are not depressed.

Questionnaire assessment of memory complaints can also facilitate the investigation of memory problems. Research on memory used in everyday life (e.g. ability to remember names and faces) has been restricted because it seems difficult to conduct (Herrmann, 1982). For instance, participants often have to be observed for long periods of time to obtain an accurate estimation of their ability and observations alone do not reveal the type of memory strategy used. In addition, laboratory tests seem threatening to many older people, so the use of memory questionnaires in lieu of such tests might increase cooperation during assessment (Gilewski & Zelinski, 1986). If questionnaire responses corresponded well with observed performance, researchers would have a method of memory assessment that would bypass at least some of the problems associated with field and experimental research, so we next report research relating to this issue.

Self-report questionnaires that have been developed usually describe prototypical memory situations and ask the respondent a number of multiple-choice questions about

how their memory functions in a specific situation (Herrmann, 1982). Evaluating the utility of memory questionnaires requires examining correlations between responses to those questionnaires and objective memory performance.

Memory questionnaires differ in the kinds of questions they ask. In general, self-report questionnaires have asked about one or more of the following: forgetting, remembering, memory quality, memory change, memory use, and attitudes about memory. The format of the questionnaires also vary. For example, participants may be asked how often they forget in absolute time (e.g., once a week), in relation to the number of opportunities (e.g., once out of every ten attempts), or relative to the amount others forget (e.g., about average compared to my peers). Memory questionnaires also vary in the amount of detail used in the questionnaire description; some memory questionnaires have very low question detail whereas other questionnaires have high question detail.

In a review, Herrmann (1982) presented evidence suggesting that self-report memory questionnaires are not a substitute for measures for memory performance. Although some questionnaires were shown to relate to performance moderately well ($r > .5$), the evidence is not strong enough to warrant using them as a sole means of assessment. In fact, some questionnaires yielded negative validity coefficients (e.g. Herrmann, 1975).

Although the correlations between self-report measures of memory and actual performance tend to be low, further investigation is still warranted. Experimenter- invoked laboratory tasks often differ substantially from memory tasks in everyday life. Herrmann (1982) states that if a memory test is not reflective of the situations asked about on a

questionnaire, the correlations between subjective complaints and objective performance have limited value. Thus, the ability of self-report memory measures to predict actual performance may be substantially better than that reported to date.

Self-report questionnaires might better predict actual performance if more specific questions were used (Mischel, 1968). The use of questionnaires that focus on only one type of performance (e.g., memory of names and faces) might also strengthen the predictive validity of memory questionnaires (Herrmann, 1982). Gilewski and Zelinski (1986) suggest that questionnaires either focus on one or several dimensions of memory functioning. Bolla et al. (1991) found that older adults tended to report more forgetting in specific situations than younger adults. They suggested that older adults may be more sensitive to situations in which they forget, whereas younger individuals pay less attention to the situations in which they experience forgetting. Christensen (1991) found that elderly individuals who considered their memory functioning to be worse than that of their peers did, in fact, have poor memory performance. However, those having general memory complaints did not differ from those without complaints on the clinical memory tasks. Larrabee, West and Crook (1991) conducted a study addressing the relationship of self-reported memory using the MAC-S (Memory Assessment Clinics Self-Report; Winterling, Crook, Salama, and Grobert, 1986) to self-rated depression and actual performance on computer simulated everyday memory tasks. They found that MAC-S Ability factors (remote, everyday and semantic memory) and Frequency factors (concentration and forgetfulness) were associated with objective performance. However other MAC-S Ability factors (numeric and spatial memory) and Frequency factors (semantic, everyday

and facial memory) had primary associations with depression. These studies suggest the importance of questionnaires which address specific types of complaints, rather than global complaints, for use with elderly adults. Herrmann (1982) states that such tests should include items that could be used to identify participants who are not focusing on the questions. All of these considerations speak to the importance of selecting an appropriate instrument to assess memory complaints.

The MAC-S, selected for use in this study, was developed by Winterling, Crook, Salama, and Grobert in 1986 to address many of the limitations of the existing scales. The MAC-S includes global items (e.g. "In general, as compared to the average individual, how would you describe your memory?"), a 21 item subscale examining overall ability to remember, and a second subscale of 24 items measuring frequency of memory failure occurrences.

The present study also addressed the association between performance on the Rivermead Behavioral Memory Test (Wilson, Cockburn, Baddley, & Hiorns, 1989) a standard measure of everyday memory functioning and the MAC-S self-rating scores in normal healthy adults. The factor structure of the MAC-S allowed us to examine specific types of subjective memory and determine their relationship to objective performance. As mention earlier Herrmann (1982) suggested that this might increase the predictive validity of self-report measures. In addition, each factor contains several items, permitting an internal consistency analysis and facilitates eliminating who are not attending to the questionnaire.

Treatment Effect

As mentioned above, the majority of older adults report subjective memory complaints (Lowenthal, Berkman, Buehler, Pierce, Robbinson & Trier, 1967). Lane and Snowdon (1989) examined a random sample of 146 older adults with a mean age of 73.6 years and reported the prevalence rate of AAMI (Age Associated Memory Impairment) to be 34.9%. Because memory decline and memory complaints are so prevalent in older adults, it is imperative that we develop effective treatments to address these concerns. One possible way to treat AAMI is through memory training. This study examined the ability of mood and memory training groups to reduce memory complaints, one of the two major diagnostic criteria for a diagnosis of AAMI.

Scogin, Storandt, and Lott (1985) examined the effectiveness of a self-taught program of memory skills for older adults who had complained of memory problems in an immediate-treatment/waiting-list design. They found a significant impact of training on memory performance but not on memory complaints. A subsequent evaluation of the waiting-list group replicated these findings. Scogin et al. reported that self-evaluations of memory performance were not systematically related to objective measures because older people seeking treatment for memory problems may have special attitudes and expectations about their cognitive abilities. Individuals who are more concerned with the aging process and more sensitive to age related changes might be more critical of changes in their own performances; though they did not verify this empirically. Low complainers, on the other hand, may have more accepting attitudes about what they consider to be parts

of the normal aging process. They further indicated that treatments should address attitudes and expectations about the aging process in addition to providing strategies that facilitate memory performance. Scogin and Bienias (1988) conducted a three year follow-up study to determine if participation in this memory training by Scogin et al. (1985) had long term effects. They found that the increased memory performance was temporary and observed no significant changes in memory complaints.

Best, Hamlett and Davis (1992) conducted a study in which one experimental training group received memory training and another (the expectancy change condition) was presented with stereotypes concerning aging and then participated in a discussion of research that contradicted these popular negative beliefs. They found that individuals in the expectancy change condition experienced a significant decline in memory complaints and those in the memory training group experienced a significant improvement in memory performance but no change in their memory complaints. These findings indicate that changing expectations of the elderly concerning their cognitive capabilities effectively decreases complaints about memory but has little impact on memory performance.

The training program used in the present study taught strategies to facilitate memory while addressing the elderly expectations about memory performance. Participants received educational instruction and discussion of memory loss and its association to aging. The purpose of this part of the training was to discourage negative stereotypes about aging and provide the participants with a more positive expectancies of the aging process. Participants were also taught several mnemonic strategies which were expected to improve performance.

Hypotheses

1. Depression was expected to be positively correlated with memory complaints.

Scores on the Beck Depression Inventory (BDI; Beck et al., 1961) and the Geriatric Depression Scale (GDS; Yesavage, Brink, Rose et al., 1983) were expected to be negatively correlated with scores on the Memory Assessment Clinics, Inc. Self Rating Scale (MAC-S; Revised, Winterling, Crook, Salama and Grobert, 1986) (low scores on the MAC-S represent more memory complaints).

2. Additional factors that were expected to influence memory complaints were physical health complaints and level of education.

a. individuals with more physical health complaints were expected to report more memory complaints.

Individuals who complained about their physical health (e.g., poor overall health at the present time, decline in physical health over the past three years, and physical health worse than their peers) were expected to have lower MAC-S scores (Winterling, Crook, Salama & Grobert, 1986).

b. higher levels of education were expected to be correlated with lower levels of memory complaints.

Individuals with more years of schooling were expected to have lower MAC-S scores (Winterling, Crook, Salama & Grobert, 1986).

3. When premorbid abilities are taken into account, participants memory complaints were expected be a more accurate representation of their memory decline.

This utilized standard scores on the American Version of the Nelson Adult Reading Test (AMNART, Schwartz & Saffran, 1987) and the Rivermead Behavioral Memory Test (Wilson, Cockburn, Baddley, & Hiorns 1989)). The standard score difference was used to predict scores on the MAC-S.

4. Certain types of memory complaints were expected to predict performance, while others are not.

MAC-S (Memory Assessment Clinics Self-Report; Winterling, Crook, Salama, and Grobert, 1986) Ability factors: remote, everyday and semantic memory and Frequency factors: concentration and forgetfulness were expected to predict objective performance.

5. Participation in Mood and Memory Workshops were expected to reduce memory complaints in older adults.

Scores on the MAC-S (Winterling, Crook, Salama & Grobert, 1986) were expected to increase at both clinical and statistical significant levels from time 1 to time 2.

METHOD

Participants and Procedures

From the ongoing Michigan State University (MSU) Psychological Clinic Aging Research Project, the participants were a subset of community dwelling elderly recruited through advertisements. Each individual was offered two assessments of their mood and memory, as well as a seven-session workshop designed to teach relaxation and cognitive strategies for the relief of depression and /or memory difficulties. This pool of 132 participants contained protocols of older individuals ranging from 47 to 90 years of age ($\underline{M}$ = 67.6 ; $\underline{SD}$ = 8.8). Of the 132 participants (87 women and 45 men), with a mean education of 14.8 years (SD = 2.8), 88 completed both pre and post testing. Adults with significant heath problems were excluded in the sample. Individuals with severe depression, as determined by scores of 30 or higher on the BDI and 20 or higher on the GDS referred elsewhere for treatment.

Each participant was administered all instruments at two different times: once before a memory training group and once immediately following the memory training group, with approximately one month between each test. Each testing period took approximately one hour. During this time demographic information was also collected.

The memory training consisted of mood and memory workshops including discussions of memory loss and its association to aging. Participants also received specialized training in mnemonic techniques (e.g., the method of loci). Seven 90 min. workshops were conducted by a clinical psychology graduate student for 6 to 8 participants. Workshops were based on a manual developed by researchers from the

Ethel Percy Andrus Gerontology Center and have demonstrated prior utility Lewinsohn, Antonuccio, Breckenridge, & Teri, 1984). Treatments of this type have been conducted since 1979; as of 1984 over 300 people had enrolled in the course. Research has shown that when evaluated as a group, the participants in this course show marked improvement, which is maintained for at least six months after the treatment (Lewinsohn, Antonuccio, Breckenridge & Teri, 1984).

Measures

a. Memory Assessment Clinics Self-Rating Scale (MAC-S, Revised, Winterling, Crook, Salama & Grobert, 1986)- Designed to assess subjective memory complaints this questionnaire contains 21 Ability items and 24 Frequency of Occurrence of memory problems items. All rated on a 5-point Likert scale, ranging from very good to very poor. Crook and Larrabee (1990) factor analyzed the performance of 1,106 subjects for a normative sample of adults ranging from 18- 92 years. West, Crook, and Larrabee (1991) showed concurrent validity of this scale. Five Ability factors were identified and labeled Remote Personal Memory, Numeric Recall, Everyday Task Oriented Memory, Word Recall/ Semantic Memory, and Spatial and Topographic Memory. On the Frequency scale, five scales were also identified, and these were labeled Word and Fact Recall, Attention and Concentration, Everyday Task-Oriented Memory, General Forgetfulness, and Facial Recognition. Crook and Larrabee (1991) reported substantial test-retest stability across 3-week intervals Ability Total $\underline{r}$ = .88 - . 94, Frequency Total r = .89 - .92).

b. American Version of the Nelson Adult Reading Test (AMNART, Schwartz & Saffran, 1987)- This measure of premorbid intelligence includes 46 words whose spelling and pronunciations are nonstandard in American English (e.g., hiatus). Standardization was conducted on 109 normal adults aged 40 - 89. In agreement with Nelson (1982) high correlations between predicted IQ using the AMNART and various WAIS IQ measures were found when the influence of education was partialled out: r = .72, .51, and .72 for VIQ, PIQ, and FSIQ respectively.

c. Beck Depression Inventory (BDI ; Beck et al., 1961) Including items addressing mood, sense of pessimism and guilt, social withdrawal, sleep disturbances, loss of energy, and weight and appetite, this 21-item 4-point scale addresses the intensity of depressive symptoms. Beck et al. (1961) reported high internal consistency (r = .93). Good test-retest reliability has also been reported (r = .74) after a three month interval (Miller & Seligman, 1973). Studies with the elderly show that the BDI has respectable internal consistency and stability for use in research with this population (Spitzer, Endicott, & Robins, 1978). It has a high detection rate for major and minor depressive disorders, with a misclassification rate of approximately 16-17% using customary BDI cutoff scores (Gallagher, Nies, & Thompson, 1982; Gallagher, Breckenridge, Steinmetz & Thompson, 1983). It seems to be a useful instrument for identification of depressed elderly.

d. Geriatric Depression Scale (Yesavage, Brink, Rose et al., 1983)- The GDS consists of 30 yes-no items. Designed specifically for use with older patients, this instrument surveys mood quite extensively with additional items to assess cognitive complaints and social behavior. Yesavage et al. (1993) suggested that the GDS is a reliable measure. Test-retest

reliability was calculated by having subjects complete the questionnaire twice, one week apart. A correlation of .85 was obtained ($p < .001$). Convergent validity was found between the GDS, the Zung Self-Rating Scale of Depression (.86), and the Hamiliton Rating Scale for Depression (.83). Furthermore, the GDS appeared to have respectable internal consistency ($r = .94$) and stability for use with the elderly. According to Yesavage et al. (1993), this scale is especially suitable for detecting depression in the elderly because it avoids classification errors due to poor physical health.

e. Rivermead Behavioral Memory Test (Wilson, Cockburn, Baddley, & Hiorns 1989)- This is a brief test of everyday memory problems. There are twelve components of the Rivermead, and are as follows: Remembering a name (first (a) and last (b)), (c) Remembering a hidden belonging, (d) Remembering an appointment, (e) Picture recognition, (f) Remembering a newspaper article (immediate and delayed), (g) Face recognition, (h) Remembering a new route (immediate), (i) Remembering a new route (delayed), (j) Delivering a message, (k) Orientation (9 questions in both time and place), and (l) Date. Each component is allocated 2 points (normal), 1 point (borderline), or 0 points (abnormal) depending on the raw score. The Standardized Profile Score is the sum of these points across all components. This enables comparison across components (Wilson, Cockborn, & Baddeley, 1995).

Wilson et al. (1989) found high interrater reliability (100%) between two raters scoring the profiles of 40 subjects (Wilson et al., 1989). High face validity as well as normative data on normal and impaired participants have also been established. The test-retest reliability with 118 patients whom were test twice yielded a correlation of .85 for

the Profile Score. Additionally, the normative study for elders (mean age 80.5 years) showed that the test was at the appropriate level of difficulty for this population.

RESULTS

Hypothesis I.

The hypothesized positive relationship between depression and memory complaints was supported. The Beck Depression Inventory (BDI; Beck et al., 1961) and the Geriatric Depression Scale (GDS; Yesavage, Brink, Rose et al., 1983) scores were expected to correlate negatively with scores on the Memory Assessment Clinics, Inc. Self Rating Scale (MAC-S; Revised, Winterling, Crook, Salama & Grobert, 1986). Recall that low scores on the MAC-S represent more memory complaints. This hypothesis was confirmed.

The BDI total score on the correlated significantly with MAC-S the total score ($r = -.38$, $p < .001$), with the ability total ($r = -.333$, $p < .001$), and with the frequency total ($r = -.38$, $p < .001$). The GDI total score also correlated with MAC-S total score ($r = -.39$, $p < .001$), with the ability sub-total ($r = -.34$, $p < .001$), and with the frequency subtotals ($r = -.37$, $p < .001$).

Depression, as measured by both the BDI and the GDS, was a significant predictor of memory complaints as measured by the MAC-S. The BDI score by itself accounted for slightly more than 14% of the MAC-S total score variance ($R^2 = .14$, $p < .001$), approximately 13% of the MAC-S frequency total score variance ($R^2 = .13$, $p < .001$), and 11% of the MAC-S ability total score variance ($R^2 = .11$, $p < .001$). The GDS score by itself accounted for slightly more than 15% of the MAC-S total score variance

($R^2 = .15$, $p < .001$), 13% of the MAC-S frequency total score variance ($R^2 = .13$, $p < .001$), and 11% of the MAC-S ability total score variance ($R^2 = .11$, $p < .001$).

Hypothesis II.

It was predicted that physical health complaints and level of education would be related to an individual's level of memory complaints.

Individuals with more physical health complaints were expected to report more memory complaints. Specifically, individuals who complained about their physical health were expected to have lower MAC-S scores (Winterling, Crook, Salama & Grobert, 1986). This hypothesis was confirmed.

Physical health complaints scores were determined by the participants responses to three questions: a) How would you rate your overall health at the present time (1-excellent, 2-good, 3-fair, 4-fair); b) is your health now better about the same , or not as good as it was three years ago (1-better, 2-the same, 3-not as good), and c) do your health problems stand in the way of doing things you want to do (1-not at all, 2-a little, 3-a great deal). We calculated the participant's physical health complaint score by summing the responses to the three items mentioned above. Level of physical health complaints reported were significantly correlated in the predicted negative direction with the total score on the MAC-S ($r = -.31$, $p < .001$), the ability total ($r = -.25$, $p < .001$), and the frequency total ($r = -.307$, $p < .001$). Physical health complaints were also found to be a significant predictors of memory complaints as measured by the MAC-S. The total physical health complaint score by itself accounted for 10% of the MAC-S total score

variance (R^2 = .10, p < .001), approximately 6% of the MAC-S ability total score variance (R^2 = .06, p < .001), and 9% of the MAC-S frequency total score variance (R^2 = .09, p < .001).

Higher levels of education were expected to be significantly correlated with lower levels of memory complaints. Individuals with more years of schooling were expected to have lower MAC-S scores (Winterling, Crook, Salama & Grobert, 1986). This hypothesis was not confirmed. Level of education was not significantly correlated with the total score on the MAC-S, the ability total, or the frequency total. Level of education did not significantly predict memory complaints.

The correlates of actual memory ability, or every day memory functioning, as determined by the sum of standard scores on the Rivermead Behavioral Memory Test (Wilson, Cockburn, Baddley, & Hiorns 1989), were also investigated. Actual ability correlated significantly with MAC-S total scores (r = .19, p < .05), ability total (r = .22, p < .01), and frequency total (r = .18, p < .05). These correlations are all positive, suggesting that a higher memory ability is associated with fewer memory complaints. Memory ability also significantly predicted MAC-S of memory complaints. There are twelve components on the Rivermead Behavioral Memory Test (RBMS); each component is allocated 2 points (normal), 1 point (borderline), or 0 points (abnormal) depending on the raw score. The Standardized Profile Score is the sum of these allocated points across components. This enables comparison across components (Wilson, Cockborn, & Baddeley, 1995). The RBMS Standard Score Profile by itself accounted for than 4% of the MAC-S total score variance (R^2 = .04, p < .05), approximately 3% of the MAC-S

frequency total score variance (R^2 = .03, p < .05), and 5% of the MAC-S ability total score variance (R^2 = .05, p < .01).

Next, all variables (GDS, BDI, Rivermead Behavioral Memory Test, Level of Education, and Physical Health Complaints) were entered into a regression model as predictors. The combination of these five variables accounted for 21% of the MAC-S total scores (R^2 = .21, p < .001); however, none of the variables turned out to be significant predictors of MAC-S total score. The uncorrected correlation between the GDS score and the BDI score is high (r = .84, p <.001) resulting in colinearity. For this reason the BDI score was eliminated from the model. The GDS score was selected as the measure of depression to be incorporated in the model because it was designed specifically for use with older patients and is especially suitable for detecting depression in the elderly because it avoids classification errors due to impaired physical health (Yesavage et al., 1993). When GDS, Rivermead Behavioral Memory Test, Level of Education, and Physical Health Complaints were entered into the model as predictors almost 20% of the variance in total MAC-S is accounted for (R^2 = .20, p < .001, GDS Beta = -.298, p < .002, Rivermead Beta = .162, p < .05, Education Beta = -.075, ns, Health Complaints Beta = -.171, ns).

Hypothesis III.

When premorbid abilities are taken into account, participants memory complaints were expected to be a more accurate representation of their memory decline. Specifically, it was predicted that individuals who had larger differences between their expected performance as determined by their scores on the American Version of the Nelson Adult

Reading Test (AMNART, Schwartz & Saffran, 1987) and their actual performance as determined by their sum of standard scores on the Rivermead Behavioral Memory Test (Wilson, Cockburn, Baddley, & Hiorns 1989) would have more memory complaints. This hypothesis was supported.

Difference scores were calculated by converting the total Rivermead Behavioral Memory Test Score and the AMNART score to standard units. The standard score on the Rivermead Behavioral Memory Test was subtracted from the standard AMNART score. Sample means were used in the calculation of standard scores. This highly educated ($\underline{M}$ = 14.8), sample yielded above average scores on these two measures. Established means therefore were not representative of this sample. The sample mean score on the Rivermead Behavioral Memory Test is $\underline{M}$ = 18.4 and on the AMNART is $\underline{M}$ = 115.1. Difference scores accounted for more than 5% of the variance in total MAC-S scores (R^2 = .05, $p < .01$), 6% in ability scores (R^2 = .06, $p < .001$,), and 4% in frequency scores (R^2 = .04, $p < .01$).

Hypothesis IV.

Certain types of memory complaints were expected to be predictive of memory performance, while others would not. Specifically MAC-S Ability factors (remote, everyday and semantic memory) and Frequency factors (concentration and forgetfulness) were expected to predict objective performance. To test this hypothesis all ten factor scores (as proposed by Winterling et al., 1986) were entered into a regression model. Only

complaints of Spatial Memory problems significantly predicted objective performance (β = .34, $p < .05$). However, overall the regression model did not fit the data.

A principal components factor analysis was run on the MAC-S to determine if the factors reported by Crook and Larrabee (1990) could be replicated. This factor structure could not be reproduced since all the items loaded onto one factor, suggesting that this scale is unidimensional. For this reason the total score on the MAC-S was used to predict objective performance as determined by scores on the Rivermead Behavioral Memory Test. Three percent of the Rivermead total score was explained by memory complaints (R^2 = .03, $p < .01$).

Hypothesis V.

Participation in Mood and Memory Workshops was expected to reduce memory complaints in older adults. Specifically, scores on the MAC-S (Winterling, Crook, Salama & Grobert, 1986) were expected to increase at both clinical and statistical significant levels from time 1 to time 2. This hypothesis was confirmed.

The mean total score on the MAC-S at pre-test (M = 153.2, SD = 23.7) was lower than that of post-test (M = 160.3, SD = 23.2) suggesting that participation in the mood and memory workshops reduced overall memory complaints. A paired difference t-test determined that this difference was statistically significant ($t(81) = -3.78$, $p < .001$). This also held true for the ability and frequency subtotals on the MAC-S .The mean ability subtotal score on the MAC-S at pre-test (M = 56.1, SD = 9.8) was lower than that of post-test (M = 58.8, SD = 9.2) suggesting that participation in the mood and memory

workshops reduced complaints about memory ability. A paired difference t-test determined that this difference was statistically significant ($t(87) = -3.45$, $p < .001$). The mean frequency subtotal score on the MAC-S at pre-test ($M = 64.0$, $SD = 10.4$) was lower than that of post-test ($M = 67.1$, $SD = 10.0$). A paired difference t-test also determined that this difference is statistically significant ($t(86) = -3.47$, $p < .001$).

The Reliable Change Index (RCI, Jacobson & Truax, 1991) was an indicator used to determine if the magnitude of change by a given participant was clinically significant. Using this index, 10 participants reported less memory ability complaints ($p < .05$, two tailed), and 17 participants reported less frequency of occurrence memory complaints. Three participants experienced an increase in ability memory complaints and six in frequency of occurrence memory complaints ($p < .05$) by RCI.

DISCUSSION

Most empirical work has demonstrated that memory complaints are not directly related to memory performance. Diagnostic decisions are often based upon the presence of subjective complaints in addition to memory impairment. It is thus important to investigate factors that might influence the relationship between complaints and performance. The first aim of this study was to look specifically at the influence of affective status and, in particular depression, physical health, education, and premorbid functioning on memory complaints. This study also explored the impact specific types of memory complaints (e.g., memory for names and faces) and their relation to objective performance because previous work has only investigated global memory complaints. Finally, the study investigated the effect of treatment on memory complaints. The influence of these factors will be discussed in more detail below.

Depression

A positive correlation between depression and memory complaints was hypothesized. Previous studies suggested that depression is an important component of memory complaints among elderly adults (Kahn, Zarit, Hilbert & Niederehe, 1975; Popkin, Gallagher, Thompson & Moore 1982; Dartigues, Mazaux. Dequae, Letenneur, Giroire, Barberger-Gateau, 1994; Poitrenaud, Malbezin & Guez, 1989). However, most of these studies examined clinical populations, such as individuals suffering from depression (Popkin, Gallagher, Thompson and Moore, 1982) or late onset dementia (Kahn, Zarit, Hilbert & Niederehe, 1975). There are some doubts that results of these studies should be generalized to the majority of older adults who are living independently

in the community. For instance, it is thought that clinically depressed patients tend to complain more about memory problems and that those with dementia have an inaccurate perception of their memory ability. It seemed important to examine the effect of depression on memory complaints in normal healthy older adults. As predicted, even mild reports of depression correlated positively with memory complaints. This suggests perhaps, that some consideration ought to be given to providing assistance for normal, older adults with memory complaints.

Depression was measured using the Beck Depression Inventory (BDI; Beck et al., 1961) and the Geriatric Depression Scale (GDS; Yesavage, Brink, Rose et al., 1983). Jones (1995) reported that when the GDS rather than the BDI was used as a measure of depression in older adults, the correlation between depression and memory complaints was below those reported earlier (e.g. Kahn, Zarit, Hilbert, & Niederehe, 1975). He suggested that the use of a depression measure such as the GDS, which measures only mood related depression without a preponderance of vegetative/somatic symptom complaints, may have contributed to the smaller correlations between depression and subjective complaints. He recommended that future investigations utilize both types of measures of depression. This study used both the BDI addressing vegetative/somatic symptoms, and the GDS addressing primarily affective components. As mentioned above, the BDI accounted for 14% of the variance in total memory complaints and the GDS accounted for 15% of the variance in total memory complaints. The difference in variance accounted for by the two measures was not significant. The participantS in this study were healthy and from high

socio-economic groups; such a population is less likely to report somatic complaints and hence might have lower BDI scores. The Geriatric Depression Scale is also a better measure to detect depression in older samples (Yesavage et al., 1993). The uncorrected correlation between the GDS score and the BDI score is high ($r = .84$, $p < .001$) resulting in colinearity. For these reason the BDI score was eliminated from the model when all the variables were entered.

Physical Health

Individuals with more physical health complaints were expected to report more memory complaints. In a recent longitudinal study Tranel, Beton, and Olson (1997), found that those who remain in good health show good preservation of memory, perception, concentration, language, and praxis on the other hand, significant health problems were associated with deterioration in neuropsychological function. This finding suggests that if physical health remains good, aging does not necessarily have an adverse effect on memory. The present study found that those who report more physical health complaints also have more memory complaints. It is possible that this finding could mean that some individuals tend to complain more overall. On the other hand, it could suggest that memory complaints are more suggestive of memory decline than previously believed. Since decline in physical health is significantly related to decline in memory functioning (Beton et al., 1997), it follows that increases in physical health complaints would be correlated with increased memory complaints, if complaints are an accurate indication of

the underlying problems (i.e., poor health and memory). It may also be that physical health complaints affect attention and concentration and thus impact memory.

Level of Education

Higher levels of education were expected to be significantly correlated with lower levels of memory complaints. This hypothesis was not confirmed. This finding differs from the results of previous investigators. Two possible explanations for this difference include the sample used and the way intellectual ability was measured. This sample was highly educated (M = 14.8, SD = 2.8), giving us very little opportunity to investigate the influence of lower levels of education on memory complaints; previous studies have demonstrated that lower intellectual ability is predictive of more memory complaints. This study may not have had enough participants with low levels of education to detect such an effect. This study also used years of education as a measure of intellectual ability. Some previous investigations that have reported significant effects used verbal IQ as a measure of intellectual ability. For example, Bolla, Lindgren, Bonaccorsy, and Bleeker (1991), found that individuals with higher levels of verbal intelligence reported fewer memory complaints, less forgetting, and placed less emphasis on forgetting. Bolla et al. (1991) also found that those with higher verbal intelligence were more likely to be well read and be better informed about the aging process and age related disorders. This knowledge may help them to recognize everyday memory problems as parts of the normal aging process rather than signs of dementia. Bolla-Wilson and Bleeker (1986) suggested that it is more

appropriate to use vocabulary level than years of education when studying older adults; older adults may not have many years of formal education but may have spent many years self educating. Future studies should include both types of measures of intellectual functioning.

Premorbid Functioning

The fourth hypothesis predicted that when premorbid abilities are taken into account, participant's memory complaints will be a more accurate representation of their memory decline. Most empirical work has demonstrated that memory complaints are not directly related to memory performance (Kahn, Zarit, Hilbert & Niederehe, 1975; Rosavage, 1990; Zelinski, Gilewski, and Schaie, 1993, Popkin, Gallagher, Thompson et al., 1982; Bolla, Lindgren, Bonaccorsy, et al., 1991). However, cognitive tests used in previous studies measured memory functions at only one point in time and were compared to normative data. Subjective measures of memory such as the MAC-S ask the participant about their memory decline and general memory functioning (e.g., How would you describe your memory to the best it has ever been). Therefore, to make accurate assessments we must also examine decline in objective memory performance when examining the relationship between complaints and performance. This study used the American National Adult Reading Test , to provide an estimate of each participant's premorbid memory ability (highest level of memory functioning during their lifetime). The discrepancy between how the participant performed at the time of testing and how they should perform based on

their premorbid IQ was calculated. A positive relationship existed between memory complaints and memory test performance when expected level of performance was considered. Greater discrepancies between current functioning and expected levels based on premorbid IQ levels predictive of more memory complaints.

Christensen (1991) examined whether memory complaints were greater in those with discrepancies between predicted and obtained memory scores compared to those without discrepancies and found a 'legitimate' basis for memory complaints. However, only six participants had memory scores more than one standard deviation below that which would be expected based on their premorbid ability. Jorm et al. (1994) reported that resulting differences scores did not increase the overall correlations between objective memory performance and subjective complaints. Because Christensen's (1991) small sample and the contradictory findings of Jorm et al. (1994), it was important to investigate further the influence of premorbid functioning.

Jorm et al. (1994) suggested that the cognitive test used in their study (the Mini-Mental State Examination, MMSE) may be a relatively blunt instrument for detecting early decline which may be noticeable to the individuals affected. This study used the Rivermead Behavioral Memory Test. The Rivermead was developed specifically to detect impairment in everyday memory functioning by providing analogues to everyday memory situations (Wilson, Cockburn, & Baddeley, 1985). Hence, the instruments used in this study are more reflective of memory decline in the early stages. Contrary to previous assertions, the present findings suggest a relationship between objective test performance and subjective

complaints can be demonstrated when a consideration is given to the extent to which memory has declined over the lifespan.

Specific Types of Complaints

It was hypothesized that certain types of memory complaints would be predictive of memory performance, while others would not. This hypothesis was not confirmed. Larrabee, West and Crook (1991) conducted a study addressing the relationship of self-reported memory using the MAC-S (Memory Assessment Clinics Self-Report; Winterling, Crook, Salama, and Grobert, 1986), self-rated depression and actual performance on computer simulated everyday memory tasks. They found that the MAC-S Ability factors: remote, everyday and semantic memory and Frequency factors: concentration and forgetfulness were predictive of objective performance. The present study addressed the association between performance on the Rivermead Behavioral Memory Test (Wilson, Cockburn, Baddley, & Hiorns, 1989) a standard measure of everyday memory functioning and the MAC-S self-rating scores in normal healthy adults. When all ten factor scores (as proposed by Winterling et al., 1986) were entered into a regression analysis, only complaints of Spatial Memory problems significantly predictive objective performance and the overall model did not fit the data.

Larrabee, West and Crook (1991) examined the relationship between self reported memory complaints and objective performance on a computer-simulated memory battery which was developed by Crook and Larrabee (1988). The computer-simulated memory

battery was designed to address the problem that standard test procedures bear little resemblance to self-report questionnaires items which usually evaluate everyday memory (e.g., remembering names and faces). However, this battery was designed to be isomorphic to the factors on the MAC-S. Hence, we would expect the two measures to be highly correlated. It was therefore important to examine the relationship of MAC-S and the Rivermead Behavioral Memory Test, a standard measure of everyday memory. The 10 individual factors as proposed were not predictive of memory performance on the Rivermead Behavioral Memory Test.

This difference in findings between the present study and the one conducted by Crook et al. (1991) can be explained by the fact that factor structure proposed by Winterling et al., (1986) did not hold in this sample. When a principal components factor analysis was conducted for this sample the items on the MAC-S clustered around one factor. There are several possible explanations. First, there were some differences in the populations sampled. The mean age of the standardization sample was 56.21, with a range of 18 to 92 years. The sample used in this study was significantly older ($\underline{M}$ = 67.6 ; $\underline{SD}$ = 8.8). The standardization sample also contained a subset of participant who were formally diagnosed with Age Associated Memory Impairment who had both memory complaints and mild memory decline; all participants in this study were community dwelling able elderly without remarkable impairment. When Winterling et al. (1986) developed the factor structure of the MAC-S they eliminated items that were highly loaded on more than one factor, however they did not eliminate these items from the scale. The items that were

eliminated from the factor model should have been eliminated from the scale and the scale should have been re-normed on a new population.

Treatment

It was predicted that participation in Mood and Memory Workshops would reduce memory complaints in older adults. This hypothesis was confirmed. Previous research has suggested that memory training can improve memory performance but not on memory complaints (e.g., Scogin, Storandt, & Lott, 1985; Scogin & Bienias, 1988). These studies examined the effectiveness of a self-taught programs for older adults who had complained of memory problems. The treatment did not try to moderate mood, did not have a facilitator to increase motivation, and did not occur in a group format. As suggested by this study and many others, emotional status greatly influences subjective memory complaints. Social interaction can also enhance positive mood.

The present training program taught strategies to facilitate memory while addressing the elderly expectations about memory performance. Participants received educational instruction and discussion of memory loss and its association to aging. The purpose of this part of the training was to discourage negative stereotypes about aging and provide the participants with more positive expectancies of the aging process. Participants were also taught several mnemonic strategies which are expected to improve performance. Using this type of training participants experienced both a statistically and clinically significant reduction in memory complaints.

These findings indicate that changing expectations concerning cognitive capabilities effectively decreases complaints about memory and suggests that the most effective memory training will be those that address both memory performance and affect. There were a few participants in this study who experienced an increase in memory complaints after participation in the memory training groups. It is possible that these individuals were experiencing stress from outside factors. This stress might have altered their mood and subsequently resulted in more memory complaints.

Limitations of Study

Some limitations of this study should be noted. First, the population is somewhat exceptional, and the generalizability of the results may be limited accordingly. Our participants were better educated than the national average and many were drawn from higher socioeconomic levels, and were generally in good physical health. These individuals also likely had access to high quality health care. Such factors could play in the role of preserving memory functioning and decreasing memory complaints. However, it could be argued that that this group actually provides a purer test of the relationship between memory complaints and objective performance because the potential influences of low education, chronic health problems, and so forth were reduced.

This study also lacked a control group. This study lacked participants who completed both the pre and the post test without participating in the mood and memory training groups. This questions the effects of participation in the group. The findings of

this study suggest that memory complaints were reduced because of participation in the memory group. However, we can't rule out the possibility that other factors influenced the change in memory complaints.

Broader Implications

Memory complaints were found to be predictive of objective performance. However, it is important to note that complaints only accounted for 3 percent of the variance in objective performance. These finding support previous findings: subjective memory complaints are not good predictors of objective performance. However, the importance of assessing premorbid ability was demonstrated.

As proposed, diagnostic criteria for Age Related Cognitive Decline are dependent upon the presence of subjective complaints in addition to memory impairment. The utility of these criteria have been questioned due to the controversial relationship between subjective memory complaints and objective performance. Under the criteria proposed it is assumed that the individual fell within the average range of memory functioning when he or she was a younger adult. Obviously, 16% of older adults fell above the normal range as younger adults. Thus an individual with superior ability as a younger adult might have experience significant loss that would not be detected by standard measures, of everyday memory. This study suggests that when making diagnosis and treatment decisions it is essential that we take into account premorbid functioning since current objective measure of memory functioning do not seem to provide accurate estimates of decline.

One consideration that must be addressed is if the magnitude of deficit seen in Age related Cognitive Decline warrants treatment. Prevalence rates of 34.9% and 55.8% have been reported in random samples of elderly adults (Lane & Snowdon, 1989; Reinikainen et al., 1990). This suggests that it is "normal" for older adults to experience some decline in their memory performance and complain about their memory ability. When older adults appear for treatment and complain that they are no longer able to read because they can not see, it would not occur to a clinician to inform them that their problems are normal and no worse than their same aged peers and hence do not warrant treatment (Crook, 1993). Therefore, despite the prevalence and mild severity (as claimed by some) of Age Associated Cognitive Decline, it is important that health care workers take an active role in developing treatment. Age Associated Cognitive Decline is associated with both memory complaints and impaired memory performance. It is important that the treatments devised address both issues. The results of this study suggest that mood and memory training groups which include discussions of memory loss and its association to aging while participants received specialized training in mnemonic techniques can significantly decrease memory complaints. These groups are cost effective, as one clinician can lead a group with six to eight participants. Future studies should analysis examine the effect of these groups on actual performance.

Directions for Future Research

Because the findings of this study suggest that memory complaints are representative of decline based on premorbid intelligence, it is essential that a longitudinal study be conducted to track the relationship between objective memory performance and

subjective complaints. If a positive relationship is found between memory decline and memory complaints over time it would further support the importance of using premorbid estimates of memory ability when making treatment decisions.

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