Published in final edited form as:

Nurs Res. 1995 ; 44(5): 306–311.

Metamemory and Depression in Cognitively Impaired Elders

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Abstract

The purpose of this study was to examine the relationships of depression and health to the perceptions of memory capacity, change, locus, and strategy in cognitively impaired residents (N = 55) of nursing homes. All subjects had Mini-Mental State Exam (MMSE) scores between 15 and 23. Subjects generally had low perceived health and mild depression. Pearson correlations between age and strategy (−.31), depression and capacity (−.44), and depression and change (−.41) aspects of metamemory were statistically significant. Division of impaired residents of nursing homes into cognitive level groups (mild and severe impairment) indicated significant group differences in use of over-the-counter medications, total memory strategies, and internal strategies. Overall, the set of variables accounted for 8% to 18% of the total variance in metamemory subscales.

Elderly individuals often interpret their memory ability and awareness through perceptions and knowledge of general and specific incidents of forgetting. This interpretation process is known as metamemory (McDougall, 1994). In one study, older adults between the ages of 60 and 94 ranked problems with memory among the five most frequently occurring daily symptoms; however, these memory concerns were also ranked among the lowest 10% of symptoms for attention — or the group that they chose to do nothing for (Haug, Wykle, & Namazi, 1989). Memory complaints, problems, and failures become a concern as individuals age, since these symptoms can interfere with or prevent everyday activities.

Cognitive impairment and the inability to perform activities of daily living are important predictors of nursing home placement (Kane, Saslow, & Bundage, 1991). The incidence of mental disorders in the residents of nursing homes has been estimated to be 80% or higher. Cognitive impairments, primarily the dementias, are the most prevalent and may include mixed affective disorders, such as depression (Burns et al., 1988; Harper & Lebowitz, 1985; Rovner & Katz, 1993). Major depressive disorders and depressive symptoms in residents of nursing homes have been documented to be 12.6% and 18.1%, respectively (Rovner et al., 1991).

For the large numbers of older adults living in nursing homes in the United States, accurate knowledge of cognitive function and, more specifically, knowledge of memory are necessary prerequisites for encouraging self-care and participation in cognitive rehabilitation programs (Abraham & Reel, 1992; Ben–Yishay & Diller, 1993; Wilson & Patterson, 1990). Therefore, the purposes of this study were to investigate the potential for assessing metamemory in a cognitively impaired (CI) population of adults and to explore the influences of depression and health status on metamemory.

Review of the Literature

Metamemory, a construct derived from metacognition, is closely related to memory and has two conceptual underpinnings, clinical and developmental. Defined from a developmental framework, metamemory is knowledge, perceptions, and beliefs about the functioning, development, and capacities of one's own memory and the human memory system. However, the construct domain subsumed under the term metamemory is complex. Hertzog, Dixon, and Hultsch (1990) include in the construct (a) factual knowledge, defined as knowledge about both the functioning of memory and the viability of strategic behaviors for tasks requiring memory processes; (b) memory monitoring, defined as awareness of how one typically uses memory as well as the current state of one's memory system; (c) memory self-efficacy, defined as one's sense of mastery or ability to use memory effectively in memory-demanding situations; and (d) memory-related affect, defined as a variety of emotional states that may be related to or generated by memory-demanding situations, including anxiety, depression, and fatigue. Metamemory not only is proposed to account for recognition of memory test demands, knowledge of appropriate mnemonic strategies, and appraisal of the limitations of a person's own mnemonic capacities but also is believed to influence the organization, guidance, and monitoring of memory processes. Metamemoiy provides a conceptual direction, road map, or starting point for determining where losses have occurred and whether these losses can be localized or ameliorated through interventions (Royall, 1994).

Jacoby and Witherspoon (1982) documented metacognitive functions as unimpaired in amnesiacs, even in the face of dramatic failures in recent episodic memory. Weingartner, Grafman, Boutelle, Kaye, and Martin (1983) found that patients with Korsakoff's syndrome demonstrated global deficits similar to those seen in individuals with dementia; however, the Korsakoff's patients were able to organize information, follow rules and principles, and recall previously acquired knowledge from semantic memory, even though recent memory might be impaired. Gervasio and Blusewicz (1988) investigated memory

Instruments:

Depression was measured with the Geriatric Depression Scale (GDS), a 30-item yes/no questionnaire (yesavage et al., 1983). Depressive responses are tallied, and the score indicates the level of depression (0 to 10 = normal, 11 to 20 = mild depression, 21 to 30 = moderate or major depression). The GDS correlates highly with other depression measures, and the authors have reported an alpha reliability coefficient of .94. The GDS has been successfully tested with cognitively intact and impaired elderly residents of nursing homes with alpha reliabilities reported as .99 and .91 (Lesher, 1986; Parmelee, Lawton, & Katz, 1989). The coefficient alpha in this sample was .83.

Health status was measured by the Health Scale, a subscale of the Multilevel Assessment Instrument (Lawton, Moss, Fulcomer, & Kleban, 1982). Subjects rated the quality of their health using a four-point response format. The anchors are "better" to "not so good" on two questions, "excellent" to "poor" on one question, and "not at all" to "a great deal" on one question. Total scores on the four-item instrument range from 4 to 13, with higher scores indicating better health. Lawton et al. (1982) reported an alpha coefficient of .76 and a test-

retest correlation of .92. Alpha in the present study was .61. Chronic conditions and prescription medications that might affect memory functioning by causing or simulating dementia were also recorded.

Metamemory was measured with the Metamemory in Adulthood (MIA) Questionnaire, a measure of the memory components of knowledge, beliefs, and affect (Dixon, Hultsch, & Hertzog, 1988). All previous investigations measuring metamemory with the MIA have compared community-residing older adults with college students. This study was the first attempt to assess metamemory factors in a cognitively impaired sample of older adults. The MIA consists of 108 statements, with responses given on two different five-point Likert scales. The response formats are divided between agree strongly, agree, undecided, disagree, disagree strongly and never, rarely, sometimes, often, always. Four of the seven subscales, measuring capacity, change, locus, and strategy, were used in this study. The MIA scales of achievement, anxiety, and task were not included, since they are extraneous representations of the major constructs within metamemory (Dixon, 1989).

Capacity is the perception of memory capacities as measured by predictive report of performance on given tasks (higher score = high capacity, 17 items); an example is “I am good at remembering names.” Change is the perception of memory abilities as generally stable or subject to decline (higher score = stability, 18 items); an example is “I can remember things as well as always.” Locus is the individual’s perceived personal control over remembering abilities (higher score = internal locus, 9 items); an example is “It’s up to me to keep my remembering abilities from deteriorating.”

Strategy is the knowledge of one’s remembering abilities such that performance in a given instance is potentially improved; it includes reported use of both internal and external strategies (+ = high use, 9 internal and 9 external items). External memory strategies include the use of calendars (one item), lists (two), notes (three), places (two), and someone (one). An example of a note is “When you finish reading a book or magazine, do you somehow note the place where you have stopped?” An example of place is “Do you routinely keep things in a familiar spot so you won’t forget them when you need to locate them?” An example of a calendar is “Do you write appointments on a calendar to help you remember them?” An example of a person is “Do you ask other people to remind you of something?”

Internal strategies include techniques such as effort (one item), elaboration (four), and rehearsal (four). Effort is the decision to attend to a learning task or to specific aspects of input and to ignore irrelevant distractors; in the MIA, the effort strategy is “Do you try to concentrate hard on something you want to remember?” Elaboration strategies for simple learning tasks include forming a mental image or sentence relating the items in one category to another (Weinstein & Mayer, 1985); an example of an elaboration strategy is “When you try to remember people you have met, do you associate names and faces with these people?” Rehearsal strategies for simple learning tasks usually involve repeating the names of items in an ordered list; in the MIA, an example of an internal rehearsal strategy question is “Do you consciously attempt to reconstruct the day’s events in order to remember something?”

The MIA's psychometric characteristics have been examined with community-dwelling, middle-aged, and older adults. Cronbach's alphas for the four subscales used here are reported as capacity, .85; change, .92; locus, .79; and strategy, .85. In a study of community-residing elders, McDougall (1993) reported that Cronbach's alphas for different subscales varied considerably, from .73 to .95. Inter-correlations between the MIA subscales ranged from extremely low, —.05, to moderate, .60 (Dixon, Hultsch, & Hertzog, 1988). The coefficient alphas in this sample were capacity, .80; change, .85; locus, .60; and strategy, .72.

Procedure:

Lists of individuals with possible cognitive disturbance, including confusion, memory loss, and other cognitive impairments, were received from the nursing staff, and these residents were then asked by the research assistant to participate in the study. All participants were able to sign informed consent forms. The staff was not notified of a resident's participation or lack thereof. Subjects were interviewed in their rooms without distractions awareness in normal adults and neurological patients with memory loss. Neurological patients were aware of their losses and reported their performance to be at a lower level than the normal group. Moreover, the agreement between their self-assessment and actual performance was greater after memory testing.

Current metacognitive research emphasizes both knowledge about cognitive states and processes and the influence or role of affective variables on learning ability (McCombs *&* Whisler, 1989; Paris & Winograd, 1990). In older adults, the most important affective variable is depression. Kahn, Zarit, Hilbert, and Niedehrehe (1975) found that even though memory complaints had little correlation with actual memory function, the presence of depression increased the probability of memory complaints. Zarit (1982), however, found that complaints of poor memory were associated with lower memory performance and greater affective symptoms even when the effects of memory performance were statistically controlled. In studies of older adults receiving psychotherapy or other treatments for depression, depression has been shown to be a mediating factor in the relationship between memory complaint and memory performance (Popkin, Gallagher, Thompson, & Moore, 1982; Williams, Little, Scates, & Blockman, 1987). Chandler and Gerndt (1988) found that with increasing age, memory complaints were greater in depressed than in nondepressed individuals. Some investigators have found that verbal self-reports of cognitive abilities do not always accurately distinguish between depression and dementia (Feehan, Knight, & Partridge, 1991; Phillips, Chu, Morris, & Hawes, 1993). Hart, Kwentus, Taylor, and Harkins (1987) documented that individuals with dementia forgot what they learned within 10 minutes after the initial stimulus was presented. Interestingly, Niederehe and Yoder (1989) reported that the depressed elderly were less inclined toward using systematic approaches to recall information, and Gilewski, Zelinski, and Schaie (1990) predicted the use of mnemonic strategies more often in the cognitively impaired elderly than in the elderly with depression.

Wells (1979) found that a relationship between depression and dementia, labeled as pseudodementia, often existed in patients. Reifler, Larson, and Hanley (1982) observed an inverse relationship between depression and severity of dementia; however, Knesevich, Martin, Berg, and Danziger (1983) found a positive relationship. Pearson, Teri, Reifler, and

Raskind (1989) found that patients with a diagnosis of depression had less cognitive impairment, as measured by the Mini-Mental State Exam (MMSE), than a nondepressed comparison group. The depressed group had a mean MMSE score of 19.0, while the nondepressed group's score was 15.2. The findings are inconclusive, however, and the relationship between depression and CI remains unclear. Elders' complaints about their memories provide information about how these individuals view their own cognitive ability, and may help to distinguish dementia from depression (Gilewski & Zelinski, 1986; McGlynn & Kaszniak, 1991; Scogin, 1985).

Cutler and Grimes (1988), who examined the data on adults 55 years of age or older from the National Health Interview Survey of 1984 (N = 14,738), found that several measures of health, functional limitations, and sensory impairments predicted everyday memory problems best but that they still accounted for only 7% of the variance in memory. In community samples of older adults, self-reports of memory were strongly and positively related to physical health and negatively related to depression and cognitive rigidity (Herzog & Rodgers, 1989; McDougall, 1995). Gilewski, Zelinski, and Schaie (1990) found that self-ratings of health accounted for 17% of the variance in self-assessed memory scores.

Health status and chronic conditions may mediate the complex relationship between subjective and objective memory status, in part because poor health or presence of chronic illness requires greater use of medications and may thus affect cognitive functioning (Perlmutter et al., 1987; Prohaska, Leventhal, Leventhal, & Keler, 1985). However, Tun, Perlmutter, Russo, and Nathan (1987) found that when depression scores were controlled for, diabetes was not a predictor of memory complaints in older adults. These studies were all conducted with community elders. More research is clearly needed on the influence of depression and health status on memory perceptions among older adults in nursing homes. This is particularly important among the cognitively impaired, since an improvement in the modifiable factors of health and depression may improve memory perceptions and memory performance.

Method

Sample:

The sample for this study was cognitively impaired adults 59 years of age and older residing in long-term care facilities. Cognitive impairment (CI) was determined with a reliable and valid screening instrument, the Mini-Mental State Examination (MMSE). This instrument contains 11 questions with values that can range from 0 to 30, with a value of 23 or less indicating CI. Usually, a score between 18 and 22 indicates mild cognitive impairment, and a score between 0 and 17 indicates severe cognitive impairment (Pearson, Cherrier, & Teri, 1989; Tombaugh & McIntyre, 1992). However, Phillips, Chu, Morris, and Hawes (1993) determined that in residents of nursing homes, an average MMSE score for the cognitively impaired was 9–97 and an average score for the cognitively intact was 21.34.

Individuals with MMSE scores between 15 and 23 participated in this study. Even though 17 is considered the cutoff for mild CI, individuals scoring either 15 or 16 were also included to ensure an adequate sample size. Alpha reliabilities for the MMSE have ranged from .83 to .

99 among groups of psychiatric, neurological, and mixed patients when interrater and test-retest reliability were studied.

To achieve a sample size of 55, 100 residents of five facilities were screened. The 45 individuals excluded had MMSE scores that were either too high or too low. In the final sample of 55 elderly subjects with a mean age of 87.13, 90% were female. Individuals had lived in the facilities for only a few years *(M* = 4.41, *SD* = 4.90) and generally had completed high school *(M* = 11.87, *SD* = 2.80). and other outside noises after all hygiene and meals were complete. Subjects responded by verbal self-report to standardized questionnaires, which acted as memory cues to everyday memory phenomena. Interviewers were trained to conduct the interviews so that responses were as accurate as possible.

Results

Means and standard deviations were computed for all major study variables and demographic information. Subjects' mean MMSE score was in the acceptable mild CI range *(M*= 20.22, *SD*=2.57). The scores for the metamemory subscales were capacity *(M* = 3–12, *SD* = .54), change *(M*= 2.44, *SD* = .55), locus *(M*= 3.14, *SD* = .48), and strategy (M- 3.25, *SD* = .58).

Subjects generally had low perceived health (M= 7.96, *SD* = 2.03) and chronic conditions *(M* = 5.24, *SD* = 2.93) and were taking prescription *(M* = 4.15, *SD* = 2.76) and over-the-counter *(M* = 1.62, *SD* = 1.31) medications. Eleven residents were taking medications for anxiety (six) or depression (five). The residents had mild depression (.*M*= 11.09, *SD*= 5.85) scores.

Exploratory analyses were done with anova on major study variables, using the absence *(n* = 29) or presence *(n*= 26) of depression with a score of 10 as the division criterion. The findings were nonsignificant for all variables except health status. The depressed group had scored higher (*M*= 8.81, *SD* = 2.17) than the nondepressed group, *F(1,* 53) = 7.21, $p < .05$, on perceived health status.

Twelve residents had a diagnosis indicating a disturbance in cognition: dementia (six), cerebrovascular accident (two), and Parkinson's disease (four). The sample was divided into two cognitive level groups with an MMSE score of 17 as the division between mild and severe impairment. There were eight subjects in the severe and 47 subjects in the mild impairment group.

Because of the uneven distribution of subjects in the mildly Cl group *(n* = 47) and the severely impaired group (*n* = 8), the Mann-Whitney *U* test was used to test for significant differences. The severely impaired group differed significantly *(p* < .05), from the mildly impaired group on three variables: over-the-counter medications (1.81 vs. .5), use of total memory strategies (3–61 vs. 3–19), and use of internal strategies (3.75 vs. 3.18).

The Pearson correlations of age with capacity, change, and locus were not significant. However, the inverse correlations of age with strategy use and external strategy use were significant at the .05 level (Table 1). The inverse correlations of depression with capacity and

change were significant at the .05 level. The inverse correlations of chronic conditions with capacity and change were also significant at the .05 level. However, the positive correlation between depression and health was likewise significant. Cognitive impairment and age were inversely correlated, but at a low level and not significantly.

Multiple regression analyses were conducted to study the influence of age in conjunction with the major variables of cognitive level, depression, health status, chronic conditions, and prescription medications on the strategy, capacity, change, and locus subscales.

In the first regression model, age was entered; however, it predicted only 8% of the variance in scores on the strategy scale. Age did not predict the capacity, change, or locus subscales. In the second regression model, age and cognitive level were entered. Neither of these met the entry criteria for inclusion. Together the demographic and cognitive level variables accounted for 8% of the variance in strategy subscale scores. Age and cognitive level predicted neither the capacity, change, nor locus subscales.

Next, analyses were conducted to determine whether the addition of depression, health, disease, and prescription medications would increase the amount of variance explained. No combination of the demographic and study variables predicted the locus subscale scores. The addition of the affective and health variables increased the overall R^2 by 19% in the capacity scores and by 17% in the change scores. The set of variables in Step 3 accounted for 19% of the variance in capacity scores, 0% of the variance in strategy scores, and 17% of the variance in the change scores. Results of the regressions for each metamemory variable are presented in Table 2.

Discussion

Although all of the residents in this study were cognitively impaired, as measured by the MMSE, only 22%(n = 12) had a diagnosis in their records indicating a possible disturbance in cognitive function. Only one of the five facilities gave standardized cognitive tests (MMSE) to the residents, and no facility assessed the presence of depression in their residents. Depressive disorders and depressive symptoms are reported to be 13% to 18% in residents of long-term care facilities; however, in this sample, even though cognitive impairment was the entry criterion, the incidence of depression was 45%. Twenty-one subjects had mild depression and 4 had major depression. The implication is that depression occurs with Cl, yet the correlations of depression with MMSE scores and age were nonsignificant in this study. Although there was an inverse relationship, neither age nor depression was significantly related to cognitive impairment.

Perceived health status scores were low, although this is not surprising, given the means for chronic conditions (5), the use of prescription medications (4), and the presence of depression. The unusual finding was the significant positive correlation between health and depression (r= .48), which indicates that better health status was associated with greater depression. This perception of feeling and thinking is supported in the literature; that is, individuals with cognitive losses and depression are, in fact, able to express how they think and feel. Clearly, these residents had greater affective and cognitive awareness than they

were given credit for, since the majority of the subjects had no documentation of cognitive status and no subject had documentation of affective status.

Depression and the metamemory subscales of capacity and change were inversely correlated. Depression was the first predictor in the capacity subscale, accounting for 19% of the variance. A high score on capacity is positive, indicating greater memory capacity. Depression was the sole predictor of the change subscale, accounting for 17% of the variance. A high score on change is also positive, indicating stability (i.e., not subject to decline). The inverse correlation seen between capacity and depression indicates that less depression was associated with better memory capacity. With less depression, the perception of change also increased — in the direction toward stability. Thus, if depression were treated, capacity (greater) and change (stability) might both improve in these individuals.

The score on the strategy subscale reflects not only the individual's knowledge of strategies but also the ability to use memory strategies, such as mnemonics and other memory aids. External strategies include writing reminder notes and making lists; internal strategies include repeating to oneself the information to be remembered or making mental associations of one item with another. A higher score indicates more frequent use of memory aids and strategies. Gilweski et al. (1990) predicted greater use of mnemonic strategies by the cognitively impaired elderly than by the elderly with depression. This hypothesis was not supported in the current study. However, the prediction was supported for the severely impaired group (MMSE scores < 17), not only for total memory strategies but also for internal memory strategies. In this study, those individuals with greater CI used more internal and total memory strategies.

This study clearly shows that metamory can be assessed in a cognitively impaired population of nursing home residents. The study provides evidence that there are different levels of memory awareness — specifically, perceptions of capacity and change — among elderly impaired adults with and without depression residing in nursing homes. Further research is needed to determine whether treatment of depression in the cognitively impaired (especially the mildly impaired) will improve their memory awareness and knowledge during memory-demanding tasks.

Acknowledgments

The statistical consultation of Richard Zeller, PhD, and Kate Spry is acknowledged. The investigator also acknowledges the assistance of Kevin Coulter, Linda Langford, and Kris Ann Loughman This study was supported by a Biomedical Research Support Grant (NCNR-507RR05947–07). A special thanks to the Margaret Wagner House, A. M McGregor Home, Royalview Manor, Amasa Stone House, and Westbay Manor.

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Table 1.

Bivariate Correlations Between Study Variables

VARIABLES	*r*
Age and health status	−.44
Age and strategy	−.31
Age and external strategy	−.31
Chronic conditions and capacity	−.27
Chronic conditions and change	−.26
Depression and capacity	−.44
Depression and change	−.41
Depression and health status	.48
Health status and capacity	−.33

$p < .05$.

Table 2.

Multiple Regression Analyses of the Relation of, Demographic and Study Variables, to the Metamemory In Adulthood Subscales

PREDICTOR VARIABLE ENTERED	*R*	R^2	*Adj.* R^2	BETA	*F*
Capacity Subscale					
Depression	.44	.19	.18	−.44	12.49
Health	.33	.11	.09	−.33	6.35
Disease	.27	.08	.06	−.27	4.30
Change Subscale					
Depression	.41	.17	.15	−.41	10.84
Strategy Subscale					
Age	.31	10	.08	−.31	5.83