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MEMORY AWARENESS AMONG JAPANESE NURSING FACILITY RESIDENTS

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SUMMARY

One hundred and seventeen elderly residents of seven geriatric health facilities located in Tokyo participated in this study. The Mini-Mental State, Metamemory in Adulthood, Geriatric Depression Health Scale and demographic questionnaires were used in face-to-face interviews. The subjects were 32 males and 85 females, with a mean age of 83.08 years. Depression was found to be a key factor for explaining metamemory. Depression accounted for 17% of the variance in capacity and 23% in change. There were no differences between the mild cognitive impairment group and the cognitively intact group on achievement, capacity, change, locus and strategy subscales. When depression was considered as a moderating factor, a difference arose between two cognitive levels. History of stroke was not related to metamemory in this study; however, future studies should emphasize memory awareness in brain injury residents since 41% of the sample had a history of CVA.

Keywords

metamemory; depression; health; cognition; nursing facility; Japanese elderly

As individuals age, memory problems and complaints about forgetfulness become a concern, since these symptoms can interfere with everyday activities (McDougall, 1995a; Cutler and Gerndt, 1988). Self-reported memory problems and forgetfulness are involved in 80% of all adults' cognitive complaints (Poon, 1985). Elderly individuals interpret their general and specific incidents of forgetting as cues about the functioning of their memories in day-to-day situations (McDougall, 1994). They often interpret their memory ability and awareness through what is called meta-memory.

Metamemory is a construct derived from metacognition. Metacognition, a supraordinate construct, was initially referred to as the self-monitoring of cognitive processes and the influence self-monitoring had on these processes when they were focused on a specific task or goal (Flavell, 1979). Metacognition was later defined as the monitoring of social cognitive

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enterprises to include all intellectual endeavors in which the aim was to think or learn about social or psychological processes in oneself, other individuals or human groups of all sizes and kinds, including social organizations, nations and people in general (Flavell, 1981). Metamemory is defined as the knowledge, perceptions and beliefs about the functioning, development and capacities of one's own memory and the human memory system (Hultsch *et al.*, 1988). Hertzog *et al.* (1990) include the following in the construct of metamemory: factual knowledge, knowledge about the functioning of memory and viability of strategic behaviors for tasks requiring memory process; memory monitoring, awareness of how one uses memory as well as the current state of one's memory system; memory self-efficacy, one's sense of mastery or ability to use memory effectively in memory-demanding situations; and memory-related affect, a variety of emotional status that may be related to or generated by memory-demanding situations. These notions or ideas by Hertzog *et al.* (1990) were defined from a developmental framework; however, metamemory has two conceptual underpinnings, developmental and clinical (McDougall, 1995b). The developmental emphasizes knowledge and beliefs and the clinical perspective emphasizes memory problems and failures, such as frequency of forgetting. Both include mnemonic strategy usage.

Metamemory can be affected by such clinical conditions as cerebral vascular accident (CVA), depression and cognitive impairment. Memory problems are a major concern of patients after CVA (Yeo *et al.*, 1996). Lincoln and Tinson (1989) studied 78 patients with CVA and found that 95% of them had memory impairment. McDougall (1998b) studied 106 nursing home residents with and without cognitive impairment and showed that depression had significant effects on perceptions of decreased memory capacity and worsening memory stability. The presence of depression has a serious negative impact on the cognitive function of stroke patients during rehabilitation (Cook and Thigpen, 1993; Wilson and Patterson, 1990; Bacher *et al.*, 1990). Memory performance is known to vary as a function of an individual's physical and emotional status and self-efficacy (McDougall, 1994). Yet, researchers have not adequately incorporated these factors into their theories or investigations (Perlmutter *et al.*, 1988). If elderly individuals' perceptions of their memories are one link in a process relating the social and cognitive domains, metamemory is of interest even if it is not a substitute for memory performance measures (Hultsch *et al.*, 1988). Furthermore, the staff of nursing facilities are often not knowledgeable about cognitive assessment, especially memory. Although cognitive assessment tools can be used mostly by doctors at admission, the staff members sometimes just do not know how elderly people are thinking or feeling about their memory. They tend to assume, without any basic knowledge, that older people are just 'old', or that the cognitively impaired elderly are not aware of their deficits. It is important to know how elderly people think of their memory in order to help care-providers give appropriate care and rehabilitation programs. Royall (1994) stated that metamemory provides a conceptual direction or starting point to determine where losses have occurred and whether these losses can be localized or ameliorated through interventions. Therefore, it is assumed that the knowledge of metamemory will also provide useful information for cognitive rehabilitation.

The purpose of this study was to investigate metamemory or memory awareness among Japanese nursing facility residents with varying degrees of cognitive function, and to

investigate the influence of depression and health on meta-memory. The long-term goals are to find ways of developing effective and culturally relevant cognitive rehabilitation programs for elderly Japanese in nursing facilities. The subjects chosen for this study were residents of nursing facilities called a 'health facility for the elderly' (HFE), since this type of facility has a strong emphasis on rehabilitation. This research is especially significant for Japan, a country that has the highest rate of ageing of its population in the world (Suzuki *et al.*, 1997; Health and Welfare Statistics Association, 1998). There has also been no previous nursing study on metamemory in this type of facility in Japan. Moreover, the incident rate of CVA is twice as prevalent in Japan as in the US (Fuld *et al.*, 1988), and it is therefore important to clarify the effect of CVA on metamemory.

METHODS

A descriptive correlational design was employed with a convenience sample of Japanese elderly. The target population for this study consisted of elderly residents of HFEs in Japan. Forty-two HFEs in the Tokyo area were screened for possible subjects and seven facilities were selected for this study. The eligibility criteria for subjects included: (a) ≥ 65 years old; (b) residents of an HFE in Tokyo, Japan; and (c) a score of over 17 on the Mini-Mental State Exam. A list of residents who were likely to fit the criteria was obtained from the nursing staff. Possible candidates were approached and, after obtaining consent, each candidate was asked questions from a questionnaire to measure cognitive function, metamemory, depression and health status and from a separate demographic questionnaire.

Cognitive function was evaluated using the Mini-Mental State Exam (MMSE) (Folstein *et al.*, 1975). The scores range from 0 to 30, with a score of 0–17 indicating severe cognitive impairment, 18–22 mild cognitive impairment and 23–30 no impairment (Pearson *et al.*, 1989; Tombaugh and McIntyre, 1992). Those who scored between 0 and 17 were excluded from this study in order to avoid the possibility of unreliable answers concerning memory awareness. The Japanese-translated version of the MMSE, which has been employed by several Japanese researchers (Okuyama *et al.*, 1996; Fukatsu *et al.*, 1994; Yoshitake *et al.*, 1994), was used in this study.

The Metamemory in Adulthood Questionnaire (MIA) was used to measure metamemory. This questionnaire, which consists of 108 questions on seven areas of metamemory, aims to measure memory components of knowledge, beliefs and affect (Dixon *et al.*, 1988). Five of the seven sub-scales, achievement, capacity, change, locus and strategy, were used in this study. The achievement scale is a measurement of perception of one's own motivation to perform well in memory tasks. Capacity is the perception of memory capacities as measured by predictive report of performance on given tasks (+ = high capacity). Change refers to an individual's perception of memory abilities as being generally stable or subject to long-term decline (+ = stability). Locus is perceived personal control over the ability to remember (+ = internality). Strategy is knowledge of one's remembering abilities such that performance in given instances is potentially improved; it consists of reported use of both internal and external strategies (+ = high use) (Hertzog *et al.*, 1987; McDougall, 1995b). The MIA was translated into Japanese and then translated back into English to check the accuracy of translation. The translation was then proofread by a professional translator. The coefficient

alphas in this sample were achievement (0.73), capacity (0.77), change (0.82), locus (0.73) and strategy (0.75).

Depression was measured using the Geriatric Depression Scale (GDS). The GDS has been translated into Japanese (Niino *et al.*, 1991) and utilized for elderly populations in Japan (Osada *et al.*, 1995; Matsubayashi *et al.*, 1994). Cronbach's alpha was reported to be 0.91 (Osada *et al.*, 1995).

The Health Scale, a subscale of the Multiple Assessment Instrument, was used to measure health status (Lawton *et al.*, 1982). The alpha coefficient and test–retest correlation are reported to be 0.76 and 0.92, respectively. This scale was also translated into Japanese by the same procedure as that used for the MIA translation. Cronbach's alpha was 0.59 in this study.

RESULTS

One hundred and seventeen elderly residents of seven HFEs in Tokyo participated in this study. The subjects ranged in age from 67 to 96 years, with a mean age of 83.08 (SD = 6.13). The study sample consisted of 27.4% ($N = 32$) males and 72.6% ($N = 85$) females (Table 1). The subjects' education ranged from 5 to 17 years, with a mean education of 9.59 years (SD 2.58). Chronic conditions affecting memory function were screened from medical records based on five categories: CVA, Parkinson's disease, dementia, cerebral arteriosclerosis, more than two of these and none of these. Fifty-nine per cent ($N = 67$) of the subjects had at least one of these medical conditions, 41.0% ($N = 48$) had a history of CVA and 13.7% had been diagnosed as having dementia (but none with the Alzheimer type).

The mean and standard deviation values were computed for all major study variables and demographic data. The MMSE scores of the sample group were $M = 23.91$ and $SD = 3.21$, indicating cognitively intact. The mean depression score of the sample was in the mild depression range ($M = 14.74$, $SD = 6.10$). However, the distribution of depression scores was large: 26.5% of the subjects were rated as non-depression, 28.2% as mild depression and 45.3% as severe depression. Perceived health status scores ranged from 4 to 13 ($M = 9.44$, $SD = 2.25$). The MIA scores for each subscale are listed in Table 2.

The Pearson correlations among major variables and demographic data were computed (Table 3). The correlation between depression and health status was significant ($r = 0.32$, $p < 0.01$), indicating that better health is associated with greater depression. In metamemory subscales, significant correlations were found between cognitive level and strategy ($r = 0.22$, $p < 0.05$), depression and capacity ($r = -0.41$, $p < 0.01$), depression and change ($r = -0.48$, $p < 0.01$), health status and change ($r = -0.23$, $p < 0.05$) and health status and locus ($r = -0.19$, $p < 0.05$). Age, education, history of stroke and medication were not related with metamemory subscales. However, the correlation between gender and achievement was significant ($r = 0.19$, $p < 0.05$), indicating that females have a greater motivation than males to perform well in memory tasks.

Multiple regression analysis was performed to study the influence of demographic and study variables on the metamemory subscales. In the first regression model, demographic variables

such as age and gender were tested. In the second model, depression, cognitive level and perceived health status were added, and finally, education, medication and history of stroke were tested. In the first model, gender was found to have a significant effect ($p = 0.025$) on achievement scale; however, it accounted for only 4% of the variance. In the second model, depression was found to be significant on capacity ($p = 0.000$) and change ($p = 0.000$). It accounted for 17% of the variance in capacity and 23% in change. In the second model, the cognitive level also had a significant ($p = 0.012$) effect on strategy; however, R^2 did not show any significant increase with the addition of this variable. The addition of education, medication and history of stroke in the final model did not cause any significant increase in R^2 . The results of the regression analysis are shown in Table 4.

The subjects were divided into two groups according to their MMSE scores: mild cognitive impairment (CI) group and cognitively intact (NCI) group ($M = 21.14$ and $SD = 1.17$ for CI, $M = 26.55$ and $SD = 1.73$ NCI). Analysis of variance was performed to compare the major study variables and demographic data in the two groups (Table 5). There was a significant difference ($F = 4.031$, $p < 0.05$) in education (9.11 vs 10.05), with the impaired group having fewer years of education. No differences were found between groups on age, depression, health and metamemory subscales in the two groups. Since 73.5% of the study sample scored in the depressed range, exploratory analysis was conducted.

The cognitive groups were divided into three groups according to the depression categories (none, mild and severe). Analysis of variance was performed for each of the three depression groups (Table 6). In the non-depressed group, there was a significant ($F = 10.405$, $p < 0.01$) difference between two cognitive levels on locus (3.33 vs 2.56), with the impaired group perceiving high control over their memory. In the mildly depressed group, there was also a significant ($F = 4.397$, $p < 0.05$) difference (2.26 vs 2.71), with the intact group using more total memory strategies.

The mean scores of metamemory subscales were compared between two groups of subjects with and without a history of stroke, but no group differences were found.

DISCUSSION

The results of this study clearly showed that there were no differences between the cognitively impaired and the cognitively intact group in memory awareness, specifically achievement, capacity, change, locus and strategy. These results differ from those of McDougall's study (1995b) on elderly Americans including nursing home residents, which clearly indicated significant differences in metamemory between two cognitive groups on three subscales: change, locus and strategy. Since the settings of this study and McDougall's study were different, it is not clear what caused these differences in the results. However, it is thought that the discrepant results were due to differences in the etiology of cognitive impairment, such as a high prevalence of CVA in the Japanese or significant effects of depression. The prevalence of both depression and CVA in this study was much higher than that of studies conducted among American nursing home residents (McDougall, 1995a; Parmelee *et al.*, 1991; Rozzini *et al.*, 1996).

In this study, history of stroke was not significantly correlated with either depression or any of the metamemory subscales. On the other hand, depression accounted for 16% of the variance on capacity and 23% of the variance on change in this study. McDougall's study (1995a) among American nursing home residents also reported depression to be a variable for predicting metamemory, especially capacity and change. Although the type of facility in this study was different, both studies revealed that depression was an important key factor for explaining memory awareness among nursing facility residents. Depression had an inverse relationship with capacity and change in this study. A high score on capacity represents greater memory capacity, and on change greater stability. Therefore, the findings indicate that as the degree of depression increases, the perception of memory capacity decreases, and the perception of change decreases towards instability or declines.

After the two cognitive groups were divided into three groups according to the depression categories (none, mild and severe), analysis of variance revealed that there were significant group differences between the two cognitive levels on metamemory: locus and strategy. This means that when depression was considered as a moderating influence in these two cognitive groups, significant differences arose in the subjects. This result indicates that individuals who have cognitive impairment perceive that they have more control over their memory than do cognitively intact individuals when they have no depression. If they have mild depression, cognitively intact individuals use memory strategy more often than do cognitively impaired individuals. It is not clear why the prevalence of depression was unexpectedly high in this study. Further investigation is needed to clarify this issue.

Another interesting finding in this study is the high scores on the achievement scale, indicating that the subjects are highly motivated to perform well in memory tasks. Although there was no significant difference on achievement scores between the two cognitive groups, both groups' scores showed in the high range (4.03 for CI and 4.05 for NIC). This is thought to be due to the high scores among female subjects (4.096). There was a significant correlation between gender and achievement subscale, indicating that females have greater motivation than males. McDougall (1998a) reported that females rated their overall memories most positively than males, although no gender differences on achievement were found in this study. The mean achievement score of male subjects in this study (3.879) was not as high as that of females, but the mean scores were higher than those reported by McDougall (1998a) (3.70 for males and 3.72 for females). It is thought that the subjects of this study had higher achievement scores because they were residents of a health facility for elderly where the emphasis is on rehabilitation. Therefore, it is reasonable to assume that the residents in this type of facility are highly motivated to perform well in memory tasks, and an appropriate memory program would therefore be very effective for these subjects.

The focus of this study was on metamemory among Japanese nursing facility residents. Knowing how elderly Japanese think and use their memory will help practitioners and other health care providers give appropriate care and develop programs for the elderly. Since forgetfulness and memory problems are reported to be a major concern among the elderly, providing appropriate care and programs will assist elderly to have a better quality of life. This study provides evidence that depression is a key factor for explaining metamemory, and elderly Japanese have varying levels of memory awareness when depression is considered as

a moderating influence on meta-memory. The results of this study also revealed that residents of a health facility for the elderly would be suitable candidates for a memory rehabilitation program. Further research is needed to learn more about the health needs of elderly Japanese in order to develop culturally relevant cognitive rehabilitation programs for elderly residents of Japanese nursing facilities.

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Table 1.

Age, education and gender distribution of the subjects

	Male (N = 32)	Females (N = 85)	Total (N = 117)
<i>Age</i>			
M	81.75	83.58	83.08
SD	5.84	6.26	6.13
<i>Education</i>			
M	9.91	9.47	9.59
SD	2.99	2.41	2.58

Table 2.

Metamemory between cognitively impaired group and cognitively intact group

Metamemory subscale	Cognitive level			<i>F</i>
	Impaired	Intact	Total	
<i>Achievement</i>				
M	4.03	4.05	4.04	NS
SD	0.51	0.50	0.50	
<i>Capacity</i>				
M	3.26	3.24	3.25	NS
SD	0.63	0.55	0.59	
<i>Change</i>				
M	2.23	2.26	2.24	NS
SD	0.67	0.53	0.60	
<i>Locus</i>				
M	2.79	2.74	2.76	NS
SD	0.75	0.67	0.70	
<i>Strategy</i>				
M	2.52	2.72	2.62	NS
SD	0.61	0.61	0.61	

Table 3.

Correlations between metamemory and study variables

	Achievement	Capacity	Change	Locus	Strategy
Cognitive level	−0.029	0.001	0.082	−0.067	0.218 *
Depression	−0.020	−0.406 **	−0.482 **	−0.175	−0.094
Health status	0.017	−0.153	−0.227 *	−0.191 *	0.003

* $p < 0.05$;
** $p < 0.01$.

Table 4. Multiple regression analysis of the relation of demographic and study variables to the metamemory scales

DV	V entered	R	R ²	β	$r \times \beta$
Achieve	Gender (I model)	0.222	0.049	0.210 [*]	0.040
Capacity	Depression (II model)	0.452	0.180 ^{**}	-0.414 ^{**}	0.168
Change	Depression (II model)	0.520	0.264 ^{**}	-0.467 ^{**}	0.225
Strategy	Cog. level (II model)	0.280	0.076	0.238 [*]	0.052

^{*} $p < 0.05$;
^{**} $p < 0.01$.

Table 5.

Cognitive-level group differences between demographics and study variables

	Cognitive level		Total	<i>F</i>
	Impaired	Intact		
<i>Educ.</i>				
M	9.11	10.05	9.59	4.031 *
SD	2.66	2.43	2.58	
<i>Age</i>				
M	83.00	83.15	83.07	NS
SD	6.39	6.02	6.17	
<i>MMSE</i>				
M	21.14	26.55	23.91	289.57 ***
SD	1.17	1.73	3.21	
<i>GDS</i>				
M	14.72	14.75	14.74	NS
SD	5.92	6.32	6.10	
<i>Health scale</i>				
M	9.12	9.73	9.44	NS
SD	1.51	1.95	2.25	

*
 $p < 0.05$;***
 $p < 0.001$.

Table 6.

Cognitive-level group differences on metamemory among the three depression categories

	Cognitive level				<i>F</i>
	Impaired		Intact		
	M	SD	M	SD	
<i>No depression</i>					
Locus	3.333	0.607	2.562	0.704	10.405***
<i>Mild depression</i>					
Strategy	2.257	0.649	2.708	0.554	4.397*

*
 $p < 0.05$;**
 $p < 0.01$.