Testing for Memory in the Filipino Elderly

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The rapidly aging population brings to fore health problems related to the elderly, one of the most feared of which is dementia of the Alzheimer's type (AD). Memory decline is the earliest presenting symptom of AD but must be differentiated from that which accompany normal aging, depression, substance abuse and other cognitive functions which are also common in the elderly. Furthermore, memory complaints increase with age and is independent of memory test performance. Different approaches and tools in memory assessment and their corresponding limitations for use among the Filipino elderly were reviewed. One of the most promising memory test is the Fuld Object Memory Evaluation Test (FOMET). A cross-sectional correlational study of 100 healthy adults with age ranging from 30 to 94 was conducted. It was found that FOMET measures were significantly correlated with age, years of education, and gender. Normal values for Filipino adults and elderly in the different FOMET measures, taking these three factors into consideration were presented. Recommendations for use of FOMET in memory testing of Filipino elderly were given.

Testing for Memory in the Filipino Elderly

The aging population of the world in general (Plum, 1979 & Schoenberg, 1986 cited in Cummings & Benson, 1992; Schultz & Ewen, 1993) and the Philippines in particular (Domingo & Feranil, 1990; Domingo, Medina & Domingo, 1994) put a peculiar challenge on

psychologists and health practitioners to address themselves to problems that typically affect this particular sector of society. With the expected rapid increase in elderly populations, experts and researchers in the health sector predict that in developing countries, there would be a shift from the predominance of health problems affecting children and child-bearing women to those affecting adults and the elderly. One of the most feared and debilitating conditions in the elderly is the dementia syndrome.

Data presented by Teng and associates (1987) show that 5% of those aged 65 or older suffer from dementia. The prevalence increases to about 20% for those aged 85 or older. Among the institutionalized geriatric population in Golden Acres in the Philippines, the prevalence of dementia is 23.19% (Familiar, 1995). More than 50% of reported cases of dementia are of the Alzheimer's type (AD). The clinical diagnosis of AD whether based on the National Institute on Neurological and Communicative Disorders and Stroke and the Alzheimer's Disease and Related Disorders Association (NINCDS-ADRDA) criteria, or the American Psychiatric Association's Diagnostic and Statistic Manual of Mental Disorders (APA-DSM), is based on a history of gradual cognitive decline that is objectively quantifiable (Morrison-Bogorad et. al., 1997). Among the different cognitive functions that decline in AD, it is generally considered that memory is the earliest to be affected (Albert, 1981; Fuld, 1983 cited in La Rue et.al., 1986; Derouesne, 1997; and Morrison-Bogorad et. al., 1997). In fact, at the stage of dementia when verbal learning is still very much preserved, learning and recall problems are already striking. Yet, memory decline may be seen in other conditions that commonly affect the elderly population. Many studies cited in Fuld (1988) have suggested that different components of learning and memory become selectively impaired in normal aging, substance abuse, depression, and other brain disease presenting as dementia syndrome, some of which are reversible.

Memory complaint among the elderly is common. Derouesne (1997) found that reduction in memory capacity is one of the most frequently reported complaints among the elderly. This finding was also supported by a regional survey in the Philippines done by Perlas (1995). Derouesne reviewed a survey conducted by Cutler and Grams (1988, cited in

Derouesne, 1997), which showed that the frequency of memory complaints increased with age. Between the ages 55 to 59, only 9.7% had memory complaints, while in the ages over 85 years, the proportion reached 22.7%. But in most of the studies he reviewed, the memory complaints were found to be independent of memory test performance. In other words, the probability that an elderly will complain of memory loss does not in any way predict a quantifiable impairment in memory test performance. This is because memory complaint in the elderly is a multifactorial symptom, influenced by biological, social and psychological determinants. In impaired memory test performance, the predominant determinant is biological, while in memory complaint, the more predominant determinant is psychosocial.

The peculiarity of memory complaints in the elderly and the significance of the symptom in differential diagnosis is such that in the clinical setting, when an assessor is faced with a question of memory, he must know about memory changes that occur with normal aging, the nature of memory complaints in older adults, and the various disorders in which memory components may be differentially disturbed (Gatz, 1994). He must be able to document and quantify memory impairment if it actually exists, taking into account the usual sensory and motor impairments common in this age group (Storandt, 1994), aside from the influences of education, social and cultural factors on memory test performance. He must be able to give the test repeatedly, and the results must be comparable to document the progressive decline in AD or improvement as a response to various interventions. For these reasons, one of the most important and critical areas for research and development is in memory testing suited for the elderly and the differential evaluation of its different components. There is now a felt need among clinical and neuropsychologists to differentiate the cognitive changes that accompany dementia from those that accompany depression and healthy aging (La Rue et. al., 1986).

Memory Disorders in the Elderly

The significance of memory impairment as a clinical symptom rests on the fear that this might constitute the first manifestation of a

Establishment of Normal Values in the Different FOMET Measures for Adult and Elderly Filipinos

In the following sections of this paper, normal values taken from the entire sample, and by education and age group will be presented for possible use in research or in the clinical setting when using FOMET for adult and elderly Filipinos. Normal values by gender were already presented in Tables 3 and 4 of the previous sections. There are two main categories for normal values, namely: memory components which include storage scores, retrieval scores, consistent retrieval scores, ineffective reminder scores, and retention scores; and rapid semantic recall which includes categories in names, foods, vegetables, and happy and sad events. All the normal values presented are sum totals across trials.

In Table 5, the means and standard deviations of memory component scores are presented by educational level. Elementary levels include from 0 to 6 years of education, while high school represents those who had from 7 to 10 years of education. College include subjects who had from 11 to 15 years of education, while Post-Graduate include subjects who had from 16 to longer years of education. Normal values are often taken as the group mean plus or minus two standard deviations. In the following tables, the means are presented in bold face while the standard deviations are presented using the normal font. For scores on ineffective reminders, normal values are scores that are *less than* the mean *plus* 2 standard deviations. For scores on the rest of the memory components like storage, retrieval, consistent retrieval and retention, normal values are scores that are *more than* the mean *minus* 2 standard deviations.

Table 6 presents the means and standard deviations obtained for the rapid semantic recall task in the FOMET by years of education. In between the five trials, subjects were asked as many items as they could in 30 seconds given a category. Scores are based on the number of items the examinees could enumerate. Data in Table 6 is presented in the same manner as Table 5. For the different categories, normal values are scores that are *more than* the mean *minus* 2 standard deviations.

On examination of the means presented in Tables 3 and 4, we could note that the females performed better in all the different components of memory measures and in the rapid semantic recall of names, foods and vegetables. T-test for the significance of these differences show that the difference in ineffective recall is significant at the .05 level while the differences in rapid semantic recall of names and foods are significant at the .01 level. All the rest of the differences are not statistically significant. The only areas where the males performed better are in the rapid semantic recall of happy and sad events. T-tests for independent groups in these two areas are not statistically significant. These results are consistent with the findings of the study by Fuld (1982), where females in both community-residing and institutionalized elderly subjects performed better in names, foods and vegetable rapid semantic recall. Fuld did not offer any possible explanation for such difference and the present authors' attempt at determining a conclusive explanation for such difference from available literature in the area of memory testing was likewise fruitless. Possible explanation for such gender-related difference could be taken from studies done in the area of language lateralization. Part and parcel of the test procedure is the necessity for word-finding which relies heavily on areas of the brain that are responsible for language. Among investigators in the area of biopsychology, Pinel (1997) noted the possibility that the brains of males and females differ in terms of lateralization of function. In a study by McGlone (cited in Pinel, 1997), it was reported that males are three times more likely than females to become aphasic after unilateral brain damage from various etiologies. These were taken as indirect evidence of differences in degree of language lateralization between the sexes. It was suggested that females are more likely than males to have their speech programming circuits localized in areas other than the Broca's and Wernicke's areas or that their language areas are less localized. But these findings were contested by other investigators such as Kolb and Whishaw (1996), who found no significant difference in the probability of having language-related impairments between the sexes in cases of left-sided lesions in the brain.

Table 2. Correlation coefficients of the different categories of rapid semantic recall with age and years of education

	NAMES	FOODS	VEGETABLES	HAPPY EVENTS	SAD EVENTS
AGE	-.44	-.43	-.32	-.40	-.35
YEARS OF EDUCATION	.39	.33	.15	.41	.35

Differences in Test Performance According to Gender

To determine whether gender has any influence in the subjects' performance in long-term storage, retrieval, consistent retrieval, retention and rapid semantic recall, a series of t-tests of independent samples were conducted. The corresponding means and standard deviations are presented in Tables 3 and 4.

Table 3. Comparison of Performance of Males and Females in Storage, Retrieval and Consistent Retrieval, Ineffective Reminders and Retention

	MALES		FEMALES	
	MEAN	SD	MEAN	SD
STORAGE	45.10	4.32	46.38	2.59
RETRIEVAL	38.28	6.05	40.24	4.66
CONSISTENT RETRIEVAL	24.18	6.57	26.56	5.52
INEFFECTIVE REMINDERS	2.86	4.19	1.52	1.92
RETENTION	8.92	1.28	9.12	1.00

Table 4. Comparison of Performance of Males and Females in Rapid Semantic Recall

	MALES		FEMALES	
	MEAN	SD	MEAN	SD
NAMES	16.30	4.94	20.92	6.56
FOODS	8.72	1.96	9.98	2.72
VEGETABLES	9.12	2.34	9.90	2.49
HAPPY	5.72	2.14	6.14	2.10
SAD	4.96	2.20	5.08	2.00

All of the coefficients presented in Table 1 are significant at alpha level less than .01 (2-tailed), except for the correlation between retention and years of education. The memory components that reflect memory efficiency such as storage, retrieval, consistent retrieval and retention all negatively correlated with age while positively correlating with years of education. On the other hand, ineffective retrieval, which is a sign of failure to recall an item even after reminder, positively correlated with age while negatively correlating with education. The opposite relationship is true but to a lesser degree between years of education and test performance.

Table 1. Correlation coefficients of the different memory components measured by FOMET with age and years of education

	STORAGE	RETRIEVAL	CONSISTENT RETRIEVAL	INEFFECTIVE REMINDERS	RETENTION
AGE	-.50	-.59	-.58	.54	-.38
YEARS OF EDUCATION	.32	.38	.32	-.27	.17

Pearson's *r* correlation coefficients between age, years of education and performance on the five categories of the rapid semantic recall were likewise computed and presented in Table 2. These were estimated by the total number of items presumably recalled from long-term storage in each category within 30 seconds.

All of the coefficients presented in Table 2 are significant at alpha level less than .01 (2-tailed) except for the coefficient between years of education and vegetables rapid semantic recall. It can be observed from Table 2 that all of the categories of the rapid semantic recall correlated negatively with age and correlated positively with years of education. The finding of decreasing test performance with advancing age could represent memory decline which accompany normal aging (Schultz & Ewen, 1993; Derouesné, 1997). The finding of better test performance with increasing years of education could represent greater ecological validity of the testing situation with increased exposure to formal education (Ledesma et. al., 1993).

The MMSE and the FOMET were given on a one-to-one basis in the room designed with minimal external stimulation. The MMSE was administered first. According to Folstein (1975), a score of at least 25 is considered normal. All those who qualified were given snacks and asked to relax first before taking the FOMET. The FOMET was administered according to the instructions provided by Fuld (1982), including the delayed recall administered 30 minutes after the main test. Instructions were translated into conversational Filipino to prevent misunderstanding and to minimize the effect of education. All the subjects were provided with results of their examinations after several weeks.

Data Analysis

Descriptive statistics, bivariate Pearson's r correlation coefficient and t-tests for independent groups were used for this study. Data were processed using the statistical package SPSS for Windows version 7.5, 1997.

Results and Discussion

Relationship of age and years of education with memory component scores

Pearson's *r* correlation coefficients were computed for the variables of age and years of education, and scores on storage, retrieval, consistent retrieval, ineffective reminders and retention. Storage score was estimated by the accumulated number of different items recalled during trials. Storage score for each trial represent the number of items for which evidence of storage has emerged by the end of the trial. Retrieval score is the number of items recalled on each trial (not accumulated). This score represents retrieval from long-term memory. Consistent retrieval score was estimated by the total number of items recalled on successive trials without reminding and ineffective reminders score was estimated by the total number of items not recalled on successive trials even after reminding the participant. Retention score is the total number of items recalled 30 minutes after the last trial of the main test. Since trial by trial scores tend to fluctuate, the author adapted the suggestion of Fuld (1982) and used sum total of scores over trials for data analysis.

Method

Research Design

This study utilized the cross-sectional correlational design. A total of 100 adult and aging participants, 50 males and 50 females were recruited from the Out-Patient Department of the Philippine General Hospital and the Golden Acres home for the aged in Quezon City. Most of those aged 70 and above come from Golden Acres. Purposive sampling was used with the following inclusion criteria: (1) at least 30 years of age; (2) able to understand and speak conversational Filipino; (3) acquired at least a score of 25 in the Mini-Mental State Examination; and (4) no significant medical, neurologic and psychiatric dysfunction to impair test performance as assessed by a physician.

The age of the participants ranged from 30 to 94 years. The mean sample age is 53.47 with standard deviation of 14.74. Years of education of the subjects ranged from 0 to 22 years. The mean number of years of education is 12.02 with standard deviation of 3.34 years.

Materials and Apparatus

All the testing were done in the neuropsychological testing room at the Central Block of the PGH. Materials and apparatus used for the test administration include the following: (1) Mini-Mental State Examination developed by Folstein (1975); (2) Fuld Object-Memory Instruction Manual and Record Forms by Fuld (1982); (3) Filipino translation of FOMET instructions developed by the author (1993); (4) black drawstring bag with ten familiar objects which include one of each the following: ball, bottle, button, card, cup, key, matchstick, nail, ring and scissors; and (5) stopwatch.

Procedure

All recruited potential participants were initially examined by a physician at PGH to screen for medical, neurologic, and psychiatric problems. Participants from Golden Acres were picked-up and brought to PGH by batches for testing. All those who qualified were asked to sign consent forms and then taken to the neuropsychological testing room at the Central Block of PGH for testing.

cases with confirmed diagnosis of dementia, depression and healthy aging. It is therefore a valuable tool for the differential diagnosis of the dementia syndrome. Furthermore, FOMET is relatively short, uncomplicated, and easy to administer. The conditions and tasks involved in the test guarantee attention and minimize anxiety. The test procedure circumvents impairments in hearing and vision, which is common in the older adults. With the use of common stimulus objects, the test procedure is able to circumvent cultural and educational differences. Alternate forms are available for repeated testing and simply involve changing the contents of the bag. A common criticism of other memory tests is low ecological validity. They include tasks such as remembering unrelated single words which is not a common activity in daily life (Schultz and Ewen, 1993). The FOMET include tasks such as naming common objects and committing these to memory, and free semantic recall of familiar word categories which has considerable ecological validity. The FOMET could therefore be a promising memory assessment tool for use among Filipino adults and elderly of various educational and socio-economic backgrounds.

Objectives of the Study

For the FOMET to be adapted and used in clinical practice in the memory assessment of Filipino elderly, normal values of the different FOMET measures representing different memory components and psychoaffective states must be established, taking into consideration significant factors that may influence test performance such as age, years of education, and gender. Such are the general objectives of this study. The specific objectives are: (1) to determine the degree and direction of correlation between age and years of education and the different components of learning and memory as measured by the FOMET; (2) to determine the influence of gender on the different components of learning and memory as measured by the FOMET; and finally (3) to establish normal values of the following FOMET measures for adult and aging Filipinos: storage, retrieval, consistent retrieval, ineffective reminders, delayed recall, and rapid semantic retrieval for names, foods, vegetables, happy and sad events; relative to age, years of education and gender.

then distracted by asking him to say words rapidly from a single category. At this point, the examiner is able to observe rapid semantic retrieval in five familiar categories such as names, foods, vegetables, and happy and sad events. After the distraction, the subject is asked to recall the items from the bag. He is then offered four more chances to learn and recall the items by reminding him of omitted items after each recall. The distraction prevents rehearsal before each recall opportunity. Hence, the number of items recalled in each trial represents retrieval from long-term storage because rehearsal in between trials is prevented. Consistency of retrieval is indicated by the number of items recalled on each trial as well as on the preceding trial.

The FOMET provides measures for the different components of learning and memory, namely: long-term storage, retrieval and retention. Because a distractor in the form of rapid semantic retrieval precedes each recall task, recall is assumed to be from long-term storage. Storage efficiency is estimated in FOMET by the number of different items recalled at all during the five trials. Retrieval efficiency is estimated by the total number of items recalled on successive trials without reminding. This is reflected in the consistent retrieval component of the scores. Ineffective reminders or recall failure is measured by each occurrence of failure to recall an item on two successive trials even after giving reminders. Retention is measured by spontaneous recall or recognition after several minutes. Aside from providing measures for the different components of memory, FOMET also allows observation of word-finding ability, left-right orientation, stereognosis, and verbal fluency. Furthermore, neurocognitive decline from depression and dementia may be distinguished through this test by the differential scores on the rapid semantic retrieval of happy and sad events. Fuld (1982) have presented normal values for older adults on the different component scores of learning and memory. Aside from these, he also presented normal values for rapid semantic retrieval by gender and age of names, foods, vegetables, happy and sad events.

It may be recalled from previous sections of this paper that La Rue and associates (1986) compared FOMET with VRT and PALT and found that FOMET provided the sharpest distinction in test performance among

The DDSS and the procedures recommended by the Dementia Council of the PNA presented herein are currently being used in the Center for Memory and Related Disorders of the Philippine General Hospital established in March 1998 and spearheaded by Dr. Ester S. Bitanga, Dr. Lourdes K. Ledesma, and Dr. Grace O. Orteza. As the number of elderly patients with memory complaints increase, the need for ecologically valid memory assessment procedures that will address the realities of clinical testing of elderly Filipinos become even more pressing. Independent and collaborative efforts are currently underway. In the following sections, results of the study on the adaptation of the FOMET, a test that may potentially address the abovestated issues, is presented for consideration.

The Adaptation of the Fuld Object-Memory Evaluation Test (FOMET) for use Among the Filipino Elderly

The FOMET has many inherent characteristics that make it a promising tool for use among elderly Filipinos. The FOMET was developed to differentially evaluate storage, retrieval and retention in a single testing occasion. It utilizes Buschke's procedure of selective reminding, which allows the differential evaluation of storage and retrieval (Buschke & Fuld, 1974 cited in Fuld 1982). Fuld (1982) have presented considerable data to support the validity and reliability of the test. Coefficient alpha was calculated at an expected correlation of .71 and estimated correlation of .84 between retrievals and on an alternate form of equal length with errorless true scores.

The procedure for test administration involves the presentation of ten common objects in an opaque bag to the patient. The patient is asked to identify each of the objects by touch and to check the correctness by subsequent visual examination. The ability to identify object by touch is known as stereognosis and the examiner is able to observe this on the subject. This procedure also provides the examiner with the opportunity to observe word-finding ability. In the process, the subject is instructed to use either the left or right hand in touching the objects inside the bag. Left and right hands are alternated systematically giving the examiner the chance to observe left-right orientation of the subject. The subject is

response characteristics of the testing situation. The setting should take into account the social and cultural conventions that the Filipino elderly are comfortable functioning in, such as in the company of their significant others and in a relaxed and open environment. The stimulus should be in their native tongue and consist of objects and themes they are familiar with. Furthermore, absence of literacy skills should not put them at a disadvantage. Finally, the acceptable responses should be based on prevalent indigenous constructs.

Following this paradigm, the memory subtest of the DDSS for instance require the subject to listen to, then immediately recall a story about Mang Nano, a farmer who planted his 3 hectares of land to rice. A typhoon destroyed what would have been a bountiful harvest. He was counting on this to pay for his loan and send his son to school. This story is an example of a familiar theme in the daily lives of the target population. Validation study of the DDSS showed a specificity of 100% and sensitivity of 94.12% in the diagnosis of dementia. Orteza (1996) compared DDSS scores with MMSE scores and found these to be significantly correlated implying that the two test may be interchangeable for use in the clinical setting.

Realizing the abovestated difficulties and limitations of directly adapting foreign developed cognitive tests and procedures for use among the Filipino elderly, the 1997 Dementia Council of the Philippine Neurological Association (PNA) came up with the following recommendations: 1) use the MMSE modified and translated into Filipino; and 2) include additional subtests in the assessment battery such as 10 Early Signs of Dementia, Abstract Thinking, Explicit Memory, and Verbal Fluency. Aside from translation and back translation of the MMSE to Filipino, the items for immediate recall and delayed recall were changed to objects common in the Filipino context such as "*bola*", "*mangga*", and "*puno*". The Explicit Memory subtest consists of two parts, namely: complex verbal material; and simple geometric design. The verbal material is a Filipino adaptation of the "Anna Thompson" story of the Wechsler Memory Scale-Revised. The 10 Early Signs of Dementia were likewise translated and back-translated to Filipino.

evidence supporting each of the test's sensitivity, reliability, and validity. The WMS includes subtests on information and orientation, concentration, paragraph recall and paired-associate recall. The Guild Memory Test has subtests on digit span, immediate and delayed paragraph recall, immediate and delayed paired-associate recall, and design recall. The NYU Memory Test have subtests in general information, list learning, digit span, paired-associate learning, picture recognition, and incidental learning. The FOMET will be discussed in detail later in this paper.

La Rue and associates (1986) studied the FOMET and two other standardized memory tests for the differential assessment of dementia, depression and healthy aging. The two other memory tests are the Benton Visual Retention Test (VRT) and the Paired-Associate Learning Test (PALT). The VRT is designed to evaluate immediate memory and visuoperceptual-visuographic functions to diagnose brain damage between the ages 15 and 64. The PALT was developed to distinguish organic brain syndromes from psychiatric disorders. It is comparatively shorter than other tests consisting only of three word pairs in each version. Based on the findings of this study, the sharpest distinction in performance among the three groups of subjects was observed on the FOMET. Predictive value computations likewise show that the FOMET is more accurate in confirming true dementia.

Memory Assessment Procedures Used Among the Filipino Elderly

In 1993, Ledesma, Orteza, Diputado and Santillan developed the Dewesternized Dementia Scale (DDSS), an expanded form of MSE which utilizes what the authors term as the "de-westernized paradigm" in clinical testing. The impetus for the development of the DDSS comes from the authors' clinical experience with the use of foreign developed tests in the diagnosis of dementia. Filipino elderly, especially the poor and minimally educated perform poorly in foreign developed tests not because they have cognitive impairment but because of the low ecological validity of the clinical testing situation. Given particular consideration in the paradigm are the setting, test stimulus characteristics, and expected

accurate description of the patient's functioning in the realms of orientation, memory, thought, feeling, and judgement. Many short test of the MSE type has been developed specifically for use in dementia screening. Most of these tests may be used by personnel who have very little neuropsychological training. Stuss et.al. (1996) compared five such tests including the Mini-Mental State Exam (MMSE), the Dementia Rating Scale (DRS), the 6-item derivation of the Orientation-Memory-Concentration Test (OMC), the Short Mental Status Questionnaire, and the Ottawa Mental Status Examination (OMSE). Results show that all the tests were highly inter-correlated, suggesting that they are interchangeable. The investigators found that among the five tests, the MMSE is the most reliable with test-retest reliability of .98.

Locasio et. al. (1995) studied 10 cognitive tests of memory, language, visuospatial abilities and reasoning which included the Information, Memory and Concentration subtest of the Blessed Dementia Scale (BDS), and the total score on an activities of daily living (ADL) questionnaire. The sample was composed of 123 patients with Alzheimer's disease and 60 normal controls. Results of the study showed that measures of explicit memory, specifically recall of a brief story and drawing a geometric figure after a 10 minute delay were the most sensitive tests to distinguish patients with Alzheimer's disease from normal controls. Tests that show linear decline over a period of time and considered best for tracking the course of Alzheimer's disease are the Information, Memory and Concentration subtest of the BDS, ADL, Boston Naming Test, Verbal Fluency Test and Benton Visual Retention Test.

Ferris and associates (1986) reviewed available psychometric performance tests that are particularly useful in assessing cognitive impairment and evaluating treatment effects among older adults. Measures were classified into two general categories namely: standardized memory tests and extended MSEs. Included in the category of standardized memory tests are the following: (1) Wechsler Memory Scale (WMS); (2) Guild Memory Test; (3) New York University (NYU) Memory Test; and (4) Fuld Object-Memory Evaluation Test (FOMET). Each of these tests were selected by the authors because they provided norms for the older age group. They have also reported reasonable

merges into studies of clinical syndromes. In 1965, the approach of cognitive clinical psychologists emerged (Talland, 1965, cited in Eisdorfer, 1986). In describing the psychopathology of memory, it was indicated that its theoretical analysis could be conceptualized in three levels, namely: at the neuropathological level, with brain lesions as the point of departure; at the psychological level, which proceeds without reference to neuropathology; and in "observations of behavior both clinical and experimental and some attempt more or less systematic, to order them within a conceptual frame of reference". The field of medicine traditionally focuses on clinical care and differential diagnosis and treatment, and more recently based on empirical studies of psychopathology and behavior using standard examination procedures. The tradition of measurement psychology is in test construction, validity, reliability, and factor-analytic studies. This has expanded to include the neuro-psychological approach to brain-behavior measurement. The conceptual model of the brain-behavior relationship (Gregory, 1996) include: (1) sensory input; (2) attention and concentration; (3) learning and memory; (4) language; (5) spatial and manipulatory ability; (6) executive functions; and (7) motor output. The order of these categories roughly corresponds to the order in which incoming information is unleased by the brain in preparation for a response or a motor output. Existing neuropsychological tests evaluate one or more of these categories. Given this model, the clinician should be cognizant of the fact that assessment of memory functions which is based on sensory stimuli and motor output cannot be clinically taken in isolation from the other categories of brain function.

Tools for Memory Assessment in the Elderly

Memory tests used for the geriatric population may be classified into three, namely: (1) memory tests which form part of the Mental Status Examination (MSE); (2) memory tests which are part of extensive neuropsychological test batteries; and (3) memory tests which were developed and used independently. Gregory (1996) defines the MSE as a loosely structured interview that usually precedes other forms of psychological and medical assessment. Its purpose is to provide an

Approaches in Memory Assessment in the Elderly

Memory and learning are two of the most complicated constructs in the field of psychology (Schulz & Ewen, 1993). The associationist approaches attribute all learning and memory to the association of stimuli and responses that occur closely together in time. Research using this approach focus on verbal stimuli and responses. An alternative conception of learning and memory is proposed in the information-processing approach. The model emphasizes the importance of encoding, storing, and retrieving information for purposes of solving problems, taking action, and acquiring new information. While the structural information-processing theories focus on the ways information is stored and organized in the human brain, the process theories, on the other hand, focus on mental activities performed when trying to learn or remember information. The structural theory considers three types of memory storage systems differentially affected by aging and include sensory memory, primary memory, and secondary memory. While sensory memory is not affected by aging, primary and secondary memory declines significantly with increasing age. On the contrary, adherents of the process theory consider only one kind of memory storage but the act of remembering is taken to consist of three basic processes namely: acquisition, retention and retrieval. Researchers in this area, so far, have been unable to determine which process is affected in normal aging. Jacoby (1984 cited in Pinel, 1997) further elaborates on the information-processing approach. Memory dysfunction could result from malfunction in any or a combination of any of the three stages of encoding, storage and retrieval. Consolidation is the process that transforms labile short-term memories into more stable long-term memories. Retrograde amnesia is considered to be a defect in retrieval while anterograde amnesia, which characterizes Korsakoff's disease, reflects a deficiency in encoding as well as retrieval.

There are three major conceptual approaches to the clinical testing of memory in the aged, namely experimental cognitive psychology, medicine, and measurement psychology. Eisdorfer (1986) provided an excellent review of these approaches. Experimental cognitive psychology focuses on theoretical memory models and contextual perspectives, which

that "non-organic" mental disorders do not have a biological basis. Amnestic disorder is defined as memory impairment in the absence of other significant cognitive impairments. Dementia, on the other hand is characterized by multiple cognitive deficits that include impairment in memory. Delirium refers to disturbance in consciousness and change in cognition that develop over a short period of time. In other words, the point of differentiation in these three groups of disorders is in the progress of the memory impairment and whether or not there is an associated impairment in other cognitive domains.

Another area of diagnostic difficulty is the fact that memory complaints in the elderly is multifactorial and could occur with or without the presence of actual quantifiable memory decline. Corollary to this, quantifiable memory decline can occur in the elderly who would not complain of memory loss. Derouesne (1997) classified elderly subjects into three categories according to the presence of memory complaint and their performance in memory tests. The first category include memory complaints related to an organic brain disease. Subjects in this category have memory disorder that affects recent facts or immediate memory. It may be associated with another higher function such as judgement, abstract thought, language, and praxis, and is therefore part of the dementia syndrome. On the other hand, the memory disorder may be the only neuropsychological disorder that is observable. The second category constitutes of memory complaints related to a psychoaffective disorder such as depression. Subjects in this category forget details that come back to them at another time. The complaint is often much more severe compared to the subject's ability to give a precise history. In some cases, the presence of psychoaffective disorder is obvious. But in other cases, differentiation from depression brought about by AD may prove very difficult. The third category consists of subjects not reporting any memory complaints. This is a heterogenous group that may include both subjects with organic brain disease and those with normal memory.

Taking the significance of memory loss as a clinical symptom among the elderly on one hand, and the diagnostic dilemma the clinician is faced on the other, the challenge is now posed on those who are working in the field of clinical assessment and testing for memory in the elderly.

degenerative brain disease, primarily AD. Morrison-Bogorad and associates (1997) presented the NINCDS-ADRDA criteria for the diagnosis of probable AD, which include the following: (1) dementia established by clinical examination and documented by the Mini-Mental State Examination (MMSE), Blessed Dementia Scale (BDS), or some similar examination, and confirmed by neuropsychological tests; (2) deficits in two or more areas of cognition; (3) progressive worsening of memory and other cognitive functions; (4) no disturbance in consciousness; (5) onset between 40 and 90 years; and (6) absence of systemic disorders or other brain diseases that by themselves could account for the progressive deficits in memory and cognition. Despite these seemingly clear-cut criteria, the clinical differential diagnosis for dementia syndrome is considerable and includes both reversible and irreversible pathophysiology.

One area of diagnostic difficulty is differentiating memory loss that is part of the normal aging process from memory impairment which is part of AD. Derouesne (1997) discussed the concept of Age Associated Memory Impairment (AAMI) which is based on four major points. First is the psychometric demonstration of diminishing memory performance with advancing age. Second is that the clinical repercussions of AAMI are attributed to the importance of secondary memory in numerous tasks of everyday life. Third is that AAMI can be demonstrated in animals. Fourth is that AAMI is based on structural (cell loss) and biological (decreased markers of neurotransmission and general metabolism: protein, carbohydrate, and lipid metabolism). But whether or not AAMI is a distinct clinical entity or part of a continuum with the severe end being dementia, remains controversial.

Another area of diagnostic difficulty is determining whether memory impairment is secondary to an amnestic disorder, delirium, or part of the dementia syndrome. The DSM-IV (1994) put together disturbances in which the clinically significant deficit is in cognition or memory that represents a significant change from a previous level of functioning. These include delirium, dementia, and amnestic and other cognitive disorders. These disorders were previously labelled "organic mental disorder" but the label is not anymore used because it erroneously implies

Table 5. Means and Standard Deviations of Memory Component Scores by Educational Level

	ELEMENTARY	HIGH SCHOOL	COLLEGE	POST-GRADUATE
STORAGE	41.83	44.68	46.23	47.63
	3.87	4.70	2.99	1.69
RETRIEVAL	31.67	37.64	40.03	43.25
	4.55	5.14	5.05	4.17
CONSISTENT	18.50	23.50	26.06	30.13
RETRIEVAL	3.39	5.36	6.03	5.67
INEFFECTIVE	5.83	2.86	1.73	1.25
REMINDER	4.12	3.91	2.95	1.75
RETENTION	8.17	8.77	9.12	9.50
	1.47	1.41	1.02	.76

Table 6. Means and Standard Deviations of Scores in Rapid Semantic Recall by Educational Level

	ELEMENTARY	HIGH SCHOOL	COLLEGE	POST-GRADUATE
NAME	10.76	15.41	19.98	22.38
	2.42	5.27	5.40	8.55
FOOD	7.33	8.55	9.52	11.75
	1.63	1.84	2.30	3.45
VEGETABLES	8.83	8.82	9.72	10.25
	2.56	2.56	2.33	2.82
HAPPY EVENTS	3.33	5.50	6.03	8.25
	1.03	1.57	2.12	3.33
SAD EVENTS	2.50	4.95	5.14	6.13
	1.05	2.06	1.97	2.64

In Tables 7 to 10, means and standard deviations of scores derived in the different memory components and the different categories of the rapid semantic recall of the FOMET are presented by age group. Data presentation and suggested utilization are similar to what has been described earlier for Tables 5 and 6.

Table 7. Means and Standard Deviations of Scores in the Memory Components by Age Group (30-59 years old)

AGE	30-39	40-49	50-59
STORAGE	47.05	47.12	46.23
	1.81	1.81	2.45
RETRIEVAL	42.32	42.00	39.73
	3.93	3.83	3.12
CONSISTENT RETRIEVAL	29.11	28.36	25.73
	5.21	5.42	3.86
INEFFECTIVE REMINDER	.79	1.20	1.41
	1.32	1.41	1.56
RETENTION	9.47	9.47	9.09
	.96	1.01	.97

Table 8. Means and Standard Deviations of Scores in the Memory Components by Age Group (60 and above)

AGE	60-69	70-79	80 AND ABOVE
STORAGE	45.39	43.00	40.14
	2.43	6.08	6.41
RETRIEVAL	36.61	35.89	30.86
	4.17	6.53	8.05
CONSISTENT RETRIEVAL	21.94	21.44	17.29
	4.52	5.73	7.50
INEFFECTIVE REMINDER	2.33	4.44	8.71
	1.71	5.34	6.52
RETENTION	8.94	8.11	8.14
	.87	1.69	1.57

Table 9. Means and Standard Deviations of Scores in Rapid Semantic Recall by Age Group (30-59 years old)

AGE	30-39	40-49	50-59
NAME	21.84	20.36	19.95
	7.32	5.89	5.57
FOOD	10.05	10.24	10.00
	3.03	2.18	2.02
VEGETABLES	10.00	10.08	10.27
	2.56	2.38	2.66
HAPPY EVENTS	6.84	6.48	6.05
	2.34	2.49	1.73
SAD EVENTS	5.53	5.32	5.68
	2.34	2.12	2.32

Table 10. Means and Standard Deviations of Scores in Rapid Semantic Recall by Age Group (60 and above)

AGE	60-69	70-79	80 AND ABOVE
NAME	15.33	14.11	13.57
	4.73	2.37	4.04
FOOD	8.44	7.78	6.57
	2.12	.97	1.27
VEGETABLES	8.67	8.44	7.29
	1.50	2.19	2.14
HAPPY EVENTS	5.22	4.89	4.29
	1.17	1.62	2.21
SAD EVENTS	4.72	3.56	3.14
	1.27	1.24	1.57

Tables 11 and 12 present over-all means and standard deviations on the different memory components and the rapid semantic recall of the FOMET. Data presentation and suggested utilization of normal values are similar to the previous tables presented.

Table 11. Over-All Means and Standard Deviations of Scores in Memory Components

	MEANS AND SD
STORAGE	45.74
	3.60
RETRIEVAL	39.26
	5.46
CONSISTENT RETRIEVAL	5.62
	1.67
INEFFECTIVE REMINDERS	2.19
	3.31
RETENTION	9.02
	1.15

Conclusions and Recommendations

In this paper, we reviewed the significance of progressive memory decline as a clinical symptom in the elderly population. We stressed the need to objectively document and quantify the symptom for purposes of differential diagnosis, monitoring progression of pathological conditions and monitoring response to various interventions specially in AD and

Table 12. Over-All Means and Standard Deviations of Scores in Rapid Semantic Recall Categories

	MEANS AND SD
NAMES	18.61
	6.23
FOODS	9.35
	2.44
VEGETABLES	9.51
	2.44
HAPPY EVENTS	5.93
	2.12
SAD EVENTS	5.02
	2.02

other related disorders. There are many different memory assessment approaches and measurement tools developed for use among the older adults, but based on clinical experience, may be of limited use among the Filipino elderly. The FOMET, because of its inherent characteristics may circumvent these limitations. Based on the findings of this study, performance in most of the memory components measured by FOMET is significantly affected by age, years of education, and gender. Hence, normal values for Filipino adults and elderly were established using group means and standard deviations, taking into account these three significant factors.

When presented with elderly patients with memory complaints, we recommend the use of FOMET as an adjunct to the MMSE and the other screening procedures recommended by the 1997 Dementia Council of the PNA. The cut-off scores for the different memory components presented in this paper may help the diagnostic process in several ways. First, memory loss secondary to normal aging may be distinguished from pathological processes using the cut-off scores adjusted to age. Second, the advantage of literacy and gender given the elements of the testing situation may be circumvented by using the cut-off scores adjusted to years of education and gender. Third, the differential scores in the rapid semantic recall of happy and sad events may help distinguish memory loss secondary to dementia from those that are brought about by psychoaffective states as suggested by Fuld.

After the initial testing, alternate forms of the FOMET may be used to confirm the diagnosis of AD and other dementia syndromes by documenting progressive decrease in raw scores over time; and monitor patient response to various interventions by documenting either an increase, a decrease, or stabilization of raw scores over time.

The establishment of normal values for elderly Filipinos in the different memory components of FOMET is simply the first step in a long process of research and development necessary to address the pressing needs of clinical memory testing in this particular population. We hope that through this paper, more clinicians will take on the challenge.

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