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The Validity of the Modified Ordinal Scales of Psychological Development (M-OSPD) for use with people in late stages of Alzheimer Disease

by

Judy Tinh Nhi Quach 

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Master of Science

Department of Occupational Therapy

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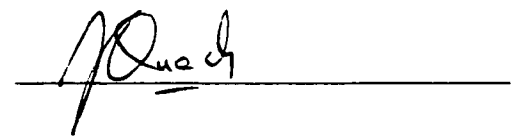

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled The Validity of the Modified Ordinal Scales of Psychological Development (M-OSPD) for use with people in late stages of Alzheimer Disease submitted by Judy Tinh Nhi Quach in partial fulfillment of the requirements for the degree of Master of Science.

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Abstract

The purpose of this study was to evaluate the concurrent and construct validity of the Modified Ordinal Scales of Psychological Development (M-OSPD). The M-OSPD is a cognitive scale developed to assess residual abilities in people who have advanced Alzheimer Disease (AD) (Auer & Reisberg, 1995). The subjects in this study were 30 continuing care residents (8 males, 22 females) in the moderately late to late stages of progressive dementia, or "probable" Alzheimer Disease as diagnosed using the DSM – IV and NINCDS-ADRDA criteria. All of the subjects were administered the Mini-Mental State Examination (MMSE), the Modified Mini-Mental State (3MS), and M-OSPD. The primary care givers (nursing staff) that took care of the residents completed the Multidimensional Observation Scale for Elderly Subjects (MOSES). Concurrent validity was determined by correlating mental status (MMSE and 3MS) with M-OSPD scores. Construct validity was determined by correlating MOSES and M-OSPD scores. Both concurrent and construct validity were acceptable. However, the coefficients for concurrent validity ($r = 0.72$ using MMSE and 3MS) were slightly lower than the 0.80 criteria; and the magnitude of the coefficient for construct validity ($r = 0.68$ using the MOSES) was higher than the 0.4 criteria set apriori.

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Words are not enough to express my appreciation to several very special people who have been crucial to my research. First of all, Dr. Lili Liu, my advisor and mentor, has guided me through times of discovery and perplexity. She has been very encouraging, patient and supportive. I thank her especially for sharing her knowledge, wisdom, and enthusiasm with me. By giving me many opportunities to learn and meet others with similar interests, she deserves the credit for getting me excited about research.

I would also like to thank the other members of my thesis committee, Drs. Sharon Warren, Glenn Griener, and Professor Masako Miyazaki. Their wisdom, critical thinking, and expertise have guided me through this study. I am most grateful for the generosity of their time.

I would like to thank my family not only for their support and encouragement but also for their willingness to share with me my stress and hard work. Their patience, love, and understanding have kept me going.

I thank the Capital Care Group for supporting my research. I thank those colleagues who challenged and encouraged me to be persistent. I also thank all the residents and their families, as well as the staff at Capital Care Lynnwood who participated in this study.

Last but not least, I would like to thank the Canadian Occupational Therapy Foundation for awarding me the $5,000 Royal Canadian Legion Fellowship in 1998. This study was presented, in part, at the 12th International Congress of the World Federation of Occupational Therapists (WFOT) in Montreal, Quebec (June 2, 1998); at the Canadian Association on Gerontology 1998 Annual Scientific and Educational Meeting in Halifax, Nova Scotia, (October 17, 1998); and at the Gerontological Society of America 51st Annual Scientific Meeting in Philadelphia, Pennsylvania (November 22, 1998).

I dedicate this thesis to all the people who suffer from Alzheimer Disease. Not only have they sparked my interest in Alzheimer research, but they have also taught me the courage of not giving up when faced with challenges.

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List of Abbreviations

AD = Alzheimer Disease

CT = Computed Tomography

M-OSPD = Modified Ordinal Scales of Psychological Development

3MS = Modified Mini-Mental State

MMSE = Mini-Mental State Examination

MOSES = Multidimensional Observation Scale for Elderly Subjects

SCU - 1 = Special Care Unit - unit with locked door; all residents are ambulatory

SCU- 2 = Supportive Care Unit – unit without locked door; not all residents are ambulatory

ADL = Activities of Daily Living

FAST = Functional Assessment Staging

GDS = Global Deteriorating Scale

BCRS = Brief Cognitive Rating Scale

NINCDS-ADRDA = National Institute of Neurological and Communicative Disorders and Stroke – The Alzheimer's Disease and Related Disorder Association

DSM –IV = Diagnostic and Statistical Manual of Mental Disorders (4^{th} edition)

CHAPTER 1

INTRODUCTION AND LITERATURE REVIEW

Alzheimer's Disease (AD), as defined by the National Institutes of Health, is a type of dementia characterized by progressive and irreversible cognitive declines that are severe enough to interfere with a person's normal daily activities and social relationships (1995). The cognitive declines include memory loss, decreased abstract thinking, time and space orientation, intellectual functioning, language and communication skills, as well as decreased knowledge and ability to use familiar objects in a functional way. The diagnosis of AD (see Appendix A for NINCDS – ADRDA and Appendix B for DSM – IV criteria) excludes any acute confusional state such as delirium and other neurological conditions that can be detected on the Computed Tomography (CT) scan (e.g., brain tumor, normal pressure hydrocephalus, multi-infarct dementia, and subdural hematoma). Clinically, the effect that AD has on people varies from person to person, depending on the individual's pre-morbid personality, education, and life experience, the progression of AD as well as on the areas of the brain that are affected.

Prevalence of AD

AD is currently one of the leading causes of death in North America. Surveys show that it affects more than 161,000 Canadians and two to four million Americans (Canadian Study of Health and Aging Working Group, 1994; Catlin & Trudeau, 1995; Clarfield, 1991; Havlik, 1997). The risk of having AD increases with age. For instance, while the prevalence of AD in people between the age of 65 to 75 is

approximately 3 % to 4 %, it increases to between 16 % and 18.7 % for people between the age of 75 to 85. It increases even further to between 32 % and 47.2 % for people over the age of 85 (Canadian Study of Health and Aging Working Group, 1994; Ebly, Parhad, Hogan, & Fung, 1994; Gauthier, 1996; Havlik, 1997).

The National Institute on Aging (1997) reported a ten-fold increase in the numbers of elderly persons (age 65 and over) in the US from 1900 to 1960. In 1994, there were about 3.5 million people over the age of 85 in the US (1 % of the entire US population). By 2020, U.S. Bureau of the Census (National Institute on Aging, 1997) projected that this number will double to 7 million. According to Statistics Canada (1993), the number of people over the age of 85 is projected to increase from 359,500 in 1996 to 475,900 in the year 2001. Thus, there is also a steady increase in the number of individuals with AD. Consequently, with more focus placed on outcome measure, the demand for accurate assessment of cognitive and functional changes in individuals with AD before and after rehabilitation intervention is also increasing.

Importance of Cognitive Assessment

Changes in cognition are among the first psycho-physiological indications of AD (McCue, Rogers, & Goldstein, 1990; Yazdanfar, 1990). Cognitive assessments provide useful information on the level of care, the need for advanced directives, the type and amount of medications, as well as the amount of stimulation that a person with AD needs (Auer, Sclan, Yaffee, & Reisberg, 1994; Herrmann, 1998). A good cognitive assessment also helps care-givers understand the difficulties with adaptive function that a person with AD experiences (Hom, 1992). For example, knowing that the person with AD has decreased short-term memory and attention span, as well as

difficulty with sequencing, a caregiver can try to simplify a task to avoid a frustrating situation for both the person with AD and the caregiver.

A comprehensive neuropsychological assessment can be used to evaluate orientation, attention and concentration, intelligence, memory, language skills, visuo-spatial skills, abstraction, reasoning, sensory and motor abilities (Hom 1992; McDougall, 1995). However, this type of assessment is expensive, time consuming and stressful for the patient. It is also unlikely that every patient who presents with symptoms of AD would undergo the same extensive and comprehensive battery of tests, given the limited resources and the increasing incidence of AD (Clarfield, 1991).

Many clinicians and researchers agree that cognitive tools for people with AD need to be as short and concise as possible in order to keep the burden of the respondent to a minimum (Auer et al., 1994; Teng & Chui, 1987; Villardita & Lomeo, 1992; Yazdanfar, 1990). To date, there are many cognitive assessment tools available to clinicians and researchers (McDowell & Newell, 1996). Each tool is selected based on its ability to assess a various range of cognitive functions (Nishimura et al., 1993; Stern & Jacobs, 1995; Villardita & Lomeo, 1992; Yazdanfar, 1990). However, only very few tools are suitable for assessing people in the later stages of AD when cognitive impairment becomes more pronounced and affects most cognitive components.

Determining the stages of AD

Through the course of AD, people who are affected experience various stages of cognitive and functional losses. The Functional Assessment Staging or FAST (Reisberg, B., 1988), can be found in Appendix C, is a functional measure that describes the progression of functional losses in people with AD through the entire course of their illness using seven consecutive stages. Stages 1 and 2 are defined as the stages where normal aging occurs with subjective decrease in memory fluidity. Stages 3 and 4 are referred to as early stages of AD with mild cognitive impairment. In stage 5, people are in the moderate stage of AD and need help with various activities of daily living (ADL). Molloy and Caldwell (1998) state that people who are from this stage onward, need 24-hour care. At these stages, people can not be left alone in their own homes unsupervised. Many people in these stages show disruptive behaviors and require institutional care. In stage 6 and 7, people are usually referred as being in the late stage of AD with severe cognitive impairment. They usually need physical assistance with many aspects of ADL.

The FAST was developed as a third component of a staging system based on previous works from Reisberg, i.e., the Global Deterioration Scale, (GDS) (see Appendix D) and the Brief Cognitive Rating Scale, (BCRS) (see Appendix E). The lower an individual with AD scores on the FAST, the higher functioning he or she is. Like its preceding tools, the FAST can be used to specify where a person has deteriorated in the course of AD, even when this person can no longer score on a more conventional cognitive test. The FAST is unique as it can be used

independently without the GDS and the BCRS. The information that is required to complete the FAST can be gathered by any caregiver who knows the client with AD well. Although the FAST only stages the progression of AD, it has been used as the "criterion measure" for examining validity of other scales (Auer et al., 1994). No gold standard exists currently for staging the progression of AD.

As the FAST measures predominantly physical functioning related to the progression of AD, it is only a differential tool for the stages of dementia. It does not measure the specific cognitive components of a typical mental status test; nor does it measure the residual abilities that approximate smaller cognitive components. Thus, two patients with similar functional impairment at a particular FAST stage (i.e., 6 or 7) may have different cognitive impairments.

Assessment of people in the moderate and late stages of AD

Most people with AD rely on their families and friends in order to live in their own homes for as long as possible. Consequently, with good physical health, some of these people will not come to the attention of Rehabilitation professionals such as Occupational Therapists until they are in the moderate to late stages of AD and begin to show behaviors that threaten their safety within the community. Others may continue to stay in the community until their informal caregivers (i.e., family) can no longer manage with their care at home.

Generally, when a person enters continuing care, his or her medical records reveal little information about previous cognitive test results. This is especially true when only portions of the chart follow the resident. The family members of the

resident are often not in possession of formal cognitive test reports. Although the physician can request further reports to be included in the chart, such information usually arrives at a much later day. Upon admission, the limited information that is found in the chart does not always allow staff to quickly understand the extent and nature of a resident's cognitive impairment (Rapp, Topps-Uriri, & Beck, 1994). Moreover, people with moderate to late stages AD can experience many difficulties with cognitive performance. These impairments may be mentioned but not described in detail in the chart. At the time of admission to a continuing care centre, some people may even lose the verbal abilities needed to perform standardized and non-standardized cognitive tests. In addition, the behavior difficulties related to these impairments may compromise their abilities to complete lengthy evaluations. Not only do cognitive tools used in this population need to require as little verbal abilities as possible, but they also need to be short and concise in order to keep the burden of the respondents to a minimum. However, bedside testing using traditional measures is frequently attempted by clinicians only to result in a statement that it is not possible to test the residents.

Occupational Therapists working in continuing care face the challenge of establishing baseline cognitive information on their residents. Without the information on a resident's individual cognitive strengths and deficits provided by a therapist, it is difficult to customize a care plan that meets the specific needs of each resident (Auer et al., 1994). Based on the author's observation and clinical experience in developing treatment plan based on the individual resident's cognitive abilities, people in late stage AD still maintain some selective (or residual) cognitive

skills. For instance, clinicians often observe that people in late stages AD can still interact with the environment using some residual cognitive abilities that are specific to each individual. Even in the late stages, there are differences in cognitive decline as often noted by the resident's families and staff working with the resident.

One way to address the limitations of standardized cognitive assessments is to use functional measures. Researchers have shown that there is a strong correlation between the level of cognitive impairment and the functional impairment that a person has (Auer et al., 1994; Dickerson & Fisher, 1995; Hill, Backman, and Fratiglioni, 1995; Tappen, 1994). However, a specific functional performance may require the use of multiple cognitive skills. It can be difficult, therefore, to determine which cognitive skills are impaired when a functional performance is observed to be impaired (Hill et al., 1995). For instance, a patient would need relatively intact perceptual skills (or spatial orientation), motor planning and sequencing skills, attention span, short term memory and orientation to time and place in order to wash and dress oneself upon rising without cueing. Without the knowledge of the specific cognitive deficits and the residual cognitive skills, it is harder for a clinician to understand why a patient fails to perform one functional task and yet is able to do a different task independently. As a result, it is more difficult for a clinician to predict a patient's functions, as well as to plan and set goals for a patient's treatment.

In dealing with the limitations of assessing only functional abilities, it has been observed that the cognitive decline of patients with dementia approximate the reverse of Piaget's sensorimotor development in infants (Reisberg, Ferris, & Franssen, 1986). Sclan, Foster, Reisberg, Franssen, and Welkowitz (1990) found that

cognitive assessment instruments employed for the assessment of infants and small children could be used to assess the residual cognitive capacities in even the most severely cognitive impaired patients. These researchers assume that cognitive and functional regression in the people with dementia mirror the reversal of the pattern of cognitive and functional development in children. The Modified Ordinal Scales of Psychological Development (M-OSPD) was developed based on this pattern (Auer et al, 1994; Auer & Reisberg, 1995).

The Modified Ordinal Scales of Psychological Development (M-OSPD)

The Modified Ordinal Scales of Psychological Development (M-OSPD) was developed by Auer and Reisberg (1995) based on Uzgiris and Hunt's Ordinal Scales of Psychological Development (1976). The responses for each of the M-OSPD scale was organized as a checklist of cognitive abilities (or items) arranged in an hierarchical manner with more weight assigned to performances that are more developmentally advanced. The M-OSPD was meant to be a "**cognitive scale**". It measures cognitive performance such as one's ability to (1) keep track of an object and form an inner picture of the object, (2) obtain objects which are desired, (3) respond to the immediate environment, (4) understand the relations between objects or persons located in different spatial positions, and (5) interact with people and objects in the environment.

The M-OSPD also has the characteristics of both an observational and functional scale. In administering the test, the examiner creates an environment to interact with a patient and observe his or her best performance. The test procedure of

the M-OSPD therefore allows for some degree of flexibility. It requires that the examiner knows the patient and knows what would elicit a definite response from him or her. With this stipulation, the M-OSPD emphasizes the measure of optimal performance under structured test situation (i.e., specific tasks) as opposed to the measure of performance under optimal standardized situation. Auer et al. (1994) recommended the use of this tool to assess people in late-stage AD who have lost verbal capacity and can not otherwise complete standardized neuropsychological testing.

The M-OSPD is straight-forward and simple to administer. It does not require any language skills from the patient, and the procedure only requires approximately half an hour. There are seven to ten items on each M-OSPD scale. All items are arranged in a hierarchical order and a patient's initial response to each task will dictate where the examiner may start on each scale. This allows for quicker administration. The M-OSPD places a low respondent burden on the patient as there is no right or wrong answer to each interactive test situation. It is easy to score as each test item is scored 1 if it is observed or 0 if it is not observed. Total scores on the M-OSPD range from 0 to a maximum of 55. The scores are relatively easy to interpret and the test comes with a manual that has detailed description of how to interpret the scores.

Reliability and validity of the M-OSPD

Sclan et al. (1990) conducted a pilot study of 26 patients (21 females and 5 males patients), to look at the internal consistency of the M-OSPD. The internal

consistency of each of the five M-OSPD scales using Spearman-Brown correction for split-half reliability ranged from 0.94 (causality) to 0.99 (object permanence).

Auer and Reisberg (1996) also reported that the M-OSPD had achieved inter-rater reliability between a clinical psychologist and a graduate student in psychology who was trained by the psychologist. The intraclass correlation coefficient (ICC) was 0.99 for total M-OSPD score ($n = 22$; $p < 0.01$) using a nursing home sample. On each of the five M-OSPD scales, the ICC values ranged from 0.93 (means-ends) to 0.98 (causality) at $p < 0.01$. Therefore, although the M-OSPD uses an interactive and flexible test procedure, it has good inter-rater reliability.

Validity of the M-OSPD is the extent to which it measures residual cognitive abilities in an elderly with AD. According to Streiner and Norman (1995), validating a scale is a process whereby people determine the degree of confidence they can put on the inferences that they make about people based on their scores from that scale. In terms of validity, Auer et al. (1994) reported that the M-OSPD had construct validity when correlated with the FAST. The Spearman correlation coefficient between the FAST and the M-OSPD was -0.77 ($p < 0.01$).

A construct can be thought of as a mini-theory to explain the relationships among various behaviors and attitudes (Streiner & Norman, 1995). For instance, the hierarchical decrease in people's cognitive abilities (i.e., the M-OSPD score) and their functional performance at the various stages of AD (i.e., FAST stage) are proposed to explain the reverse stages of people's developmental abilities. The Spearman value of - 0.77 (Auer et al., 1994) indicates that people with more advanced AD (i.e.,

higher score on the FAST) perform poorer on the M-OSPD (i.e., lower score on the M-OSPD). To examine construct validity, one could correlate the scores of a new scale, i.e., the M-OSPD, with the scores of another measure that is known to evaluate a similar or related construct, i.e., the FAST.

As the FAST stages are essentially the same as the Global Deterioration Scale stages (or GDS, see Appendix D) used in the inclusion criteria in Auer et al's study (1994), this method of subjects selection may introduce bias towards inflating the value of correlation. Moreover, functional (predominantly physical functional), functional behaviors (more global), and cognitive scales can all measure different foci related to the deterioration in AD (i.e., the hierarchical deterioration of AD as a construct). The M-OSPD, as a cognitive scale, should therefore correlate with other cognitive and functional scales (Hill et al., 1995; Villardita & Lomeo, 1992). At this point, other than Auer et al.'s study (1994), there is still limited information on the construct validity of the M-OSPD. As opposed to following Auer et al's work and using a staging scale to further explore the construct validity of the M-OSPD, other functional scales should be considered. More specifically, it is advantageous to further establish the construct validity of the M-OSPD using another commonly used functional behavior scale.

In the same study, Auer et al. (1994) also correlated the M-OSPD with the Mini Mental Status Examination (or MMSE, see Appendix G). However, they did not report any statistical significance. Most of their participants (45 out of 70) could not achieve a score on the MMSE. In fact, all but one of the participants in Stage 7 of the FAST (n = 45) scored 0. Their attempt was unsuccessful due to the poor range of

the MMSE scores obtained by the subjects, 46 of whom were in stage 7 and 24 people were in stage 6 of the FAST. The mean MMSE score in this study (n = 70) was 1.8 out of 30 (SD = 3.7).

In summary, there exists few tests that can be administered and, at the time, capture the performance of people with severe impairment and low functioning dementia. One promising tool, the M-OSPD, has demonstrated high inter-rater reliability and some work on its validity has begun. However, more research is needed to examine the validity of the M-OSPD for two reasons: 1) Previous work to look at construct validity used the FAST, a staging tool which was also used to select the subjects. This process may have introduced a bias thereby inflating the high correlation value. 2) Previous work on its concurrent validity used the MMSE, a mental status screening tool that was unable to capture the performance of most of the subjects in the late stage dementia.

The following chapter describes the method used to conduct a study that would give more information on the construct and concurrent validity of the M-OSPD.

CHAPTER 2

METHODS

This study used a descriptive, cross sectional design to further investigate the concurrent and construct validity of the M-OSPD. The objectives of this study were to:

- Evaluate the concurrent validity of the M-OSPD using the 3MS. The Mini-Mental State Examination (MMSE) was added to the concurrent validity study as both mental status tests could be administered simultaneously (Teng & Chui, 1987, see Appendix G). This would replicate part of Auer et al.'s study (1994) and allow for comparison of results between the two studies.

- Evaluate the construct validity of the M-OSPD using the Multidimensional Observation Scale for Elderly Subjects (MOSES) (see Appendix H).

Instrumentation

The cognitive measures chosen in this study were the Modified Mini-Mental State (3MS) as well as the MMSE. The functional behavior measure chosen was the Multidimensional Observation Scale for Elderly Subjects (MOSES).

The Modified Mini Mental State Examination (3MS):

The 3MS is a modification of the MMSE (Appendix G). It was developed by Teng and Chui (1987) to enhance the usefulness of the MMSE as the MMSE shows a "floor effect" when used with people in the late stages of AD. Similar to the MMSE,

the 3MS measures (1) orientation, (2) immediate and short term recall, (3) attention span and calculation, (4) reading, (5) writing, (6) ability to name, (7) ability to comprehend and (8) follow verbal and (9) written commands, (10) ability to write a sentence, and (11) the ability to copy a complex and abstract figure.

The 3MS aims to extend the ceiling (maximum score) and the floor (minimum score) of the MMSE; it samples a wider range of cognitive abilities as there are more items on the 3MS than the MMSE. For people in the moderate stage of AD, the 3MS has finer grading in the scoring. The range of scores is from 0 to 100 compared to 0 to 30 on the MMSE; Teng and Chui (1987) have established an interrater reliability of 0.98 and a correlation of 0.69 (using the MMSE), both only on the drawing item of the 3MS. However, they do not have a large enough data yet to conduct statistical analyses of other reliability and validity of the 3MS. In recent years, the 3MS is used more commonly in community health and continuing care practices (Barnes, 1998; Canadian Study of Health and Aging Working Group, 1994; Eastwood, 1991; Grace et al.,1995; Lamarre & Patten, 1991).

The Mini-Mental State Examination (MMSE):

Since its development, the MMSE (Folstein, Folstein, & McHugh, 1975) has been used clinically as a base-line screening assessment because of its relatively brief administration time (i.e.,10 - 20 minutes), its having withstood "the test of time" (at least since 1975) and its familiarity amongst many healthcare disciplines (Auer et al., 1994; Cockrell & Folstein, 1988; Ihl, Frolich, Dierks, Martin, & Maurer, 1992; Stern & Jacobs, 1995; Yazdanfar, 1990). The MMSE has test-retest reliability of at least

0.89 over a 24-hour period using both psychiatric and neurological populations (Folstein, Folstein, & McHugh, 1975). The interrater reliability from the same study is 0.82. The positive correlations between the MMSE scores and findings of positive and negative scans from computerized tomography and from electroencephalography demonstrate convergent validity (Tsai & Tsuang, 1979; Tune & Folstein, 1986).

The MMSE has an 87 percent sensitivity and an 82 percent specificity (Cockrell & Folstein, 1988). Applegate, Blass, and Williams (1990) also noted that the MMSE is useful in testing patients with moderate impairment and can be used repeatedly to accurately assess changes of cognitive function over time in patients with AD in a variety of clinical settings. Other researchers have concurred that the MMSE is useful in longitudinal studies that measure cognitive decline in people with AD (Brooks III et al., 1993; Cockrell,& Folstein, 1988; Salmon, Thal, Butters, & Heindel, 1990). However, various studies have shown that the MMSE is influenced by age, low education and is not as sensitive in detecting mild or severe impairment (Applegate et al., 1990, Auer et al., 1994; Fiedler & Klingbeil, 1990; Monsch et al., 1995; Murden, McRae, Kaner, & Bucknam, 1991; Stern et al., 1994; Uhlmann & Larson, 1991).

Comparison between the 3MS and the MMSE:

Currently, clinicians use both 3MS and the MMSE as standardized tools for evaluation as well as for screening due to the short and concise nature of both tests. Both tests are widely used in AD research to stage the severity and progression of the disease (Canadian study of Health and Aging Working Group, 1994; Hill et al.,

1995). The MMSE is used in more studies (Auer et al., 1994; Royall, Mahurin, Cornell, & Gray, 1993a; Royall, Mahurin, True et al., 1993b) but the 3MS has more range in scores and is useful for assessing people in moderate stage of AD. Compared to the MMSE, the 3MS is however not more useful in assessing people in the early and late stages of AD. Large studies such as the Canadian Study of Health and Aging study claim that the 3MS is superior to the MMSE as it covers more aspects of cognitive impairment. Teng and Chui (1987) recommend the 3MS to be administered in conjunction with the MMSE as it can easily be done within a similar timeframe as just administering the MMSE. In practice, many clinicians do so for the benefits of obtaining results that have better range of scores (e.g., 3MS) and that can easily be compared to other studies in the literature (MMSE).

The Multidimensional Observation Scale for Elderly Subjects (MOSES):

The Multidimensional Observation Scale for Elderly Subjects (or MOSES), found in Appendix H, is a functional behavioral measure. As functional deterioration and disruptive behavioral manifestations are results of cognitive decline, functional and behavioral functional measures are often used by clinicians, especially Occupational Therapists, to substitute or complement a cognitive assessment that has "bottomed out" (Applegate et al., 1990; Dickerson & Fisher, 1995; McCue et al., 1990).

Clinicians have observed that disruptive behaviors often reflect disturbance of cognitive and functional abilities. In late stage AD where people are dependent on others for their functional care, the author has noted that functional-behavioral scales

provide a wider range of scores than most traditional functional scales. For this reason, many studies have focused on the use of behavior scales to complement cognitive assessment (Kaye, Grigsby, Robbins, & Korzun, 1990; Mintzer et al., 1993; Nishimura et al., 1993; Rossby, Beck, & Heacock, 1992; Sultzer, Levin, Mahler, High, & Cummings, 1993; Villardita & Lomeo, 1992).

The MOSES has been used to evaluate several aspects of the behavioral function of elderly people (Helmes, Csapo, & Short, 1987). It is frequently used in continuing care settings to define the severity of functional impairment of the elderly and to measure program outcome. Most often, higher scores on the MOSES indicate that the residents are more functionally impaired and require more staff time to help with their care.

The MOSES does not require the direct involvement of elderly people in the assessment process. The questions to the caregivers are worded in an objective manner and are easy to understand. The MOSES has an internal consistency coefficient of .80 and an acceptable range of interrater reliabilities coefficients of .97 for self-care functioning, and .58 for depressed and anxious mood. Since its development, the MOSES has been adopted by the Ontario Mental Health Foundation as a research scale for assessing behavior of the institutionalized elderly (Helmes, Csapo, & Short, 1987).

Study Participants

Individuals in the moderate and late stages of AD (i.e., approximately FAST stage 5, 6 and 7) were selected for this study. This differed from Auer et al.'s study (1994) as they only recruited people in FAST stages of 6 and 7. As the participants

were selected from a wider cognitive subgroup, it was predicted that they would also show a wider range of scores on the mental status tests (MMSE and 3MS). The primary care nursing staff were asked to rate the participants' functional abilities using the MOSES.

In this study, the M-OSPD was administered to residents who were in the moderate and late stages of Alzheimer Disease on two units (supportive and special care units) in a continuing care setting (i.e., at Capital Care Lynnwood). According to the sample size calculation (Appendix I, Cohen, 1988), a minimum of 22 participants (11 in each group) were required to detect a correlation coefficient of 80% between the M-OSPD, 3MS/MMSE (Appendix I). To increase the power of this study, the sample size was increased to 30 participants. To be included, residents must have:

- A diagnosis of primary progressive dementia.
- FAST staging of 5, 6, or 7 (See Appendix C).
- Signed informed consent (See Appendix J)

The resident was excluded based on:

- A past history of cerebrovascular disease, mental retardation, alcohol abuse, schizophrenia (i.e., symptoms from such conditions may show similar impairment as AD but are of differential diagnosis, have different neuropathological nature, and may not be progressive).

- Concurrent diagnoses of head trauma, seizures, or other neurological disorders apart from dementia of the Alzheimer type (i.e., symptoms from such conditions may add to the overall impairment caused by AD).

After identifying all the people who met the criteria for the study, the researcher applied the table of random numbers to the first two digits of the residents' personal health numbers and selected 15 residents from each of the two units. Stratified random selection technique based on the site was used. The Special Care Unit had 50 residents and the Supportive Care Unit had 74 residents.

Background information about the residents and the SCU units

Both the Special Care and the Supportive Care Units admitted people 65 years and older with moderate to late stage dementia. Both units also admitted people with disruptive behaviors such as agitation, aggression, or disruptive vocal repetition. The purpose of both units was to manage the care of the residents with cognitive impairment and provide them with supportive care and therapy. All the residents were assessed within four to six weeks of their admission to the unit as defined by the care procedure to obtain a baseline cognitive profile. Detailed information on the residents' cognitive and functional abilities was very important in order for staff to develop effective care plans. At the clinical level, the standard assessments in place on both units already included the MMSE. The 3MS was recently added to the standard assessment list therefore both the MMSE and the 3MS were tests that had been approved for use within Capital Care Lynnwood.

As the residents on SCU-1 were all ambulatory, the Special Care Unit (SCU-1) had locked exit-doors operated by an electronic keypad. These residents often had very noticeable disruptive behaviors (i.e.: yelling, grabbing, pushing, wandering, eloping) and needed a specific care approach that was best met when staff were consistent and flexible. There was a higher percentage of people with AD on this unit. For instance, 30 out of 50 people met the inclusion criteria for this study. As not all of residents on SCU-2 were ambulatory and they had less specific disruptive behaviors outside of self-care situations, the Supportive Care Unit (SCU-2) did not have locked exit-doors. There was also a lower percentage of people with AD on this unit. Only 27 out of 74 people met the inclusion criteria for this study.

Most people on either of these two units already had a diagnosis of progressive dementia. They were all in stages 5, 6, or 7 of the FAST. When a resident was admitted to either unit, the attending physician updated the physical examination of that resident. This included comprehensive laboratory tests, a review of the current medications, and a list of physical, neurological, or psychiatric problems other than dementia. The physician also differentiated the diagnosis of AD from other forms of dementia, using DSM-4, or NINCDS-ADRDA criteria (see Appendices A and B).

Pilot testing of the M-OSPD

The M-OSPD was also pre-tested on five residents from another advanced dementia unit (n = 48). Twenty five out of forty eight people met the inclusion criteria for the study but only five people (2 males, 3 females) were selected for the

pilot testing. Informed consent was sought in similar manner to the actual study. The residents were given just the M-OSPD to assess for clarity, length, and acceptability of the test (i.e., the residents were not too tired and could not participate in the testing). Although staff and families queried the participants' abilities to participate in testing, 4 of the participants had scores ranging from 13 to 32 and only 1 person scored 0 (out of 55) on the M-OSPD. Three of the subjects were alert and not tired at the end of the test sessions. The time required to administer the M-OSPD ranged from 15 to 45 minutes. This suggested that it was feasible to proceed with a study using 30 subjects.

Ethical Considerations

At the time of the study, the author was a staff Occupational Therapist on a short-stay Mentally Dysfunctioning Elderly Unit (a dementia and behavior assessment unit) at Lynnwood. Ethical approval was obtained from the Health Research Ethics Board panel B (see Appendix J), and from the Capital Care Group Research and Evaluation Review committee to implement this study. The author did not have any clinical responsibilities with the long-term residents on the SCUs and Advanced Dementia units. This was to address and satisfy the issues relating to informed consent when dealing with family members of the residents. Without any clinical responsibilities with the potential research participants, the researcher did not have the dilemma of playing a dual role of both clinician and researcher. The families could therefore more freely give their informed consent (See Appendix J for information sheet and consent form).

The Research Assistant, who administered the M-OSPD, 3MS, and MMSE to the participants, was a senior year Master of Science student in Speech Pathology and Audiology who was knowledgeable in the area of speech impairment related to dementia. As she was finishing her placement at Lynnwood, she already passed the police record check and was well aware of issues related to confidentiality. She knew the staff and the policies at Lynnwood well but did not work directly with any of the residents who met the inclusion/exclusion criteria for this study. She was able to develop quick rapport with the residents and could get the optimal performance on the M-OSPD from the residents as suggested by Auer et al. (1994).

As the residents with moderate to late stage AD could not legally give consent to participate in research, the families or guardians who were responsible for the residents' well-being and decision making, were asked to provide informed consent. Informed consent was obtained from the families (or guardians) of a resident when they met with the researchers to discuss the details of the study. The residents were invited through their families to participate in the study. The reading level of the informed consent was set at grade 7.

Even though the informed consent had been given and signed by the families, the residents had to demonstrate their assent to participate in the study. Only one resident from the Special Care unit (ambulatory) could sign her own informed consent form after her daughter had given consent for her to participate in the study. The other participants gave their assent and participated in the testing. Permission was granted by Dr. Auer to use the M-OSPD for this study (see appendix K).

Informed consent

During each session, the residents were free to participate or refuse. If they still maintained the ability to sign the informed consent, they were asked to sign the form (Appendix J). This was a formality for the subjects to exercise their autonomy and to indicate their assent towards participation. If a resident refused and refusal to cooperate was clear and obvious, i.e., clear dissent during any of the attempts, the resident was dropped from the research participant list immediately. Another resident was randomly selected from the identified list of residents with moderately late to late stages AD.

The residents who participated in the study consisted of 8 men (27%) and 22 women (73%). Two women from the SCU-1 (i.e., ambulatory) and one man from the SCU-2 (i.e., not necessarily ambulatory) were selected but did not participate in the study. The reason for these withdrawals was related to obtaining informed consent. For one lady, her daughter lived outside of Edmonton, gave the researcher verbal consent over the phone but could not come in to sign the consent because she was too ill. The families of the other two residents signed the consent forms but both residents refused to be tested; they were withdrawn from the study immediately.

Procedure

It took a maximum of 30 minutes to administer the M-OSPD and about 30 minutes to administer the mental status tests (MMSE/3MS). Both sets of tests were given at the same session if the resident was not fatigued. Each of these test sessions took about 35 to 60 minutes. If the tests needed to be given in two sessions, the resident was tested at about the same time on different days. The order of the set of

tests that the residents did first was randomized by a toss of coin to avoid systematic bias. Some residents did the M-OSPD first while others did the MMSE/3MS first.

The researcher consulted the nursing staff prior to testing each resident. The residents were tested at a time that was not in conflict with their care schedule, nor at a time of the day when they were agitated. If it was not a good time (i.e., resident was having a bad day and was agitated), the Researcher Assistant would leave and arrange to come back later for up to a maximum of three times. Only one resident from the Supportive Care Unit (not necessarily ambulatory) required the Research Assistant to come back for a second time due to fatigue (related to the pain control treatment for skin-cancer) during the first session. All participants could manage all three tests (3MS, MMSE, and M-OSPD) within one test session.

The researcher reviewed the MOSES with all the primary care staff. These caregivers were asked to fill out the MOSES on approximately the same day on which their residents were given the tests. Should any staff need assistance or clarification on the MOSES, they could ask the Principal Investigator at the phone number listed on each unit while the data was being collected. In this study, none of the staff required further assistance nor clarification as they were already familiar with the MOSES. Although the MOSES took less than 10 minutes to complete, staff participation was strictly voluntary. The researcher asked for their assistance with the study and made it clear that their participation was not work-related. However, all three Care Managers on the two units approved that the staff could complete the MOSES during work hours. All of the staff agreed to participate.

Data Analysis

The Statistical Package for Social Sciences (SPSS, version 8.0, 1997) was used to analyze the data. Although the participants were chosen from two slightly different units (i.e., ambulatory versus not-necessarily-ambulatory units), they were selected using similar inclusive/exclusive criteria. T-tests were used to compare means for education and age to ensure that the two groups were similar and that the residents' scores from the two groups could be treated as combined data. The level of significance was set at $p \leq 0.05$ for all tests.

As both the M-OSPD and the 3MS measured cognitive and cognitive processing skills, a strong correlation between the tests was expected. To evaluate concurrent validity of the M-OSPD (objective 1), the acceptable Pearson r between the M-OSPD and the 3MS scores was set at 0.8 (McDowell & Newell, 1996).

While the M-OSPD was a cognitive scale, the MOSES was a functional behavioral scale. The MOSES was designed to measure the amount of staff time a resident required in an institution. Unlike the M-OSPD, the MOSES was not designed to directly measure deterioration in people with AD even though the questions in the MOSES included many behaviors that were characteristics amongst people with AD. As both the M-OSPD and the MOSES were observational measures and both can be used to measure deterioration related to AD, a moderate correlation between the tests was expected. To evaluate construct validity of the M-OSPD and the MOSES (objective 2), the acceptable Pearson r for convergent validity between the M-OSPD and the MOSES scores was set at 0.4 (McDowell & Newell, 1996).

CHAPTER 3

This chapter first describes the characteristics of the participants in the Special Care Unit (SCU-1) and Supportive Care Unit (SCU-2), then the distribution of the scores on the M-OSPD, 3MS, MMSE, and the MOSES. Next, the correlation matrix between the tests is reported.

RESULTS

Study Participants

All participants were diagnosed using the NINCDS – ADRDA criteria (see Appendix A). Two people were also diagnosed by the DSM – IV criteria (see Appendix B) as they had been assessed by mental health services; one had a history of anxiety and the other person had a history of depression with anxiety. Randomly, with the toss of a coin, 17 participants (57%) were given the MMSE/3MS first while 13 people (43%) were given the M-OSPD first. T-test was used to compare the means of education and age of the participants from the two units. There was significant difference between the groups in terms of age ($t = -2.468$, $p = 0.021$) but no significant difference in term of education ($t = 1.069$, $p = 0.296$) as shown in Table 1.

Table 1: Mean age and education of the participants

	Unit	N	Mean	SD	Independent Student t-test	
					t	p-value
Age	1	13	79.00	8.23	-2.468	0.021
	2	14	86.21	6.95		
Education	1	13	11.23	4.11	1.069	0.296 (NS)
	2	12	9.42	4.38		

Note: NS = not statistically significant

Unit 1 = SCU-1 = ambulatory, locked exit-doors

Unit 2 = SCU-2 = not necessary ambulatory, no locked doors

Participants' scores on the two units were grouped in the analysis of validity. The mean age of the participants in this study was 82.7 years (standard deviation was 8.3 years). The participants' age ranged from 67 to 94 years (n = 27). The median age was 84 years. The mean year of education of the participants in this study was 10.2 years (standard deviation was 4.0 years). The participants' education ranged from grade 2 to Ph.D. levels of education (n = 25).

Missing data

Age data was missing for three participants and education data was missing for five participants. One participant died of skin cancer shortly after testing. As the information on her age and education was not available in the chart, the researcher did not ask the family as they already had many things to attend to at that time. Two other participants did not have information on their ages nor years of education (i.e., one person had two birthdays listed in the chart, the other person only had an approximate birthday listed). These participants had friends listed as contact-persons (with enduring power of attorney) in the chart but their friends did not know their exact dates of birth. In addition, two other people did not have information on their years of education in their charts (n = 2). Their families were not contacted to provide further information.

Distribution of scores on the M-OSPD, 3MS, MMSE and the MOSES

All participants scored less than 17/30 on the MMSE. The distribution on the M-OSPD, MMSE, 3MS, and MOSES of the 30 participants are as followed:

Figure 1: Distribution of Scores on the M-OSPD (max = 55) (n =30)

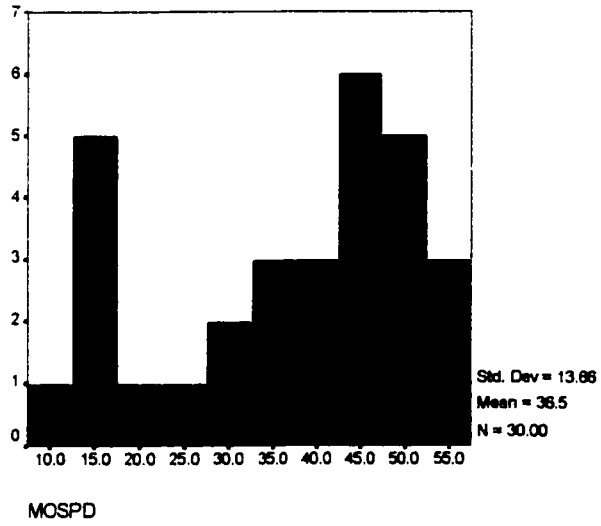


Figure 2: Distribution of Scores on the 3MS (max = 100) (n = 30)

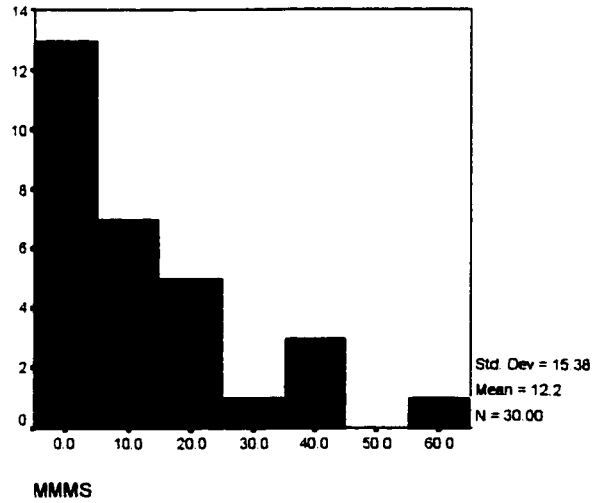


Figure 3: Distribution of Scores on the MMSE (max = 30) (n = 30)

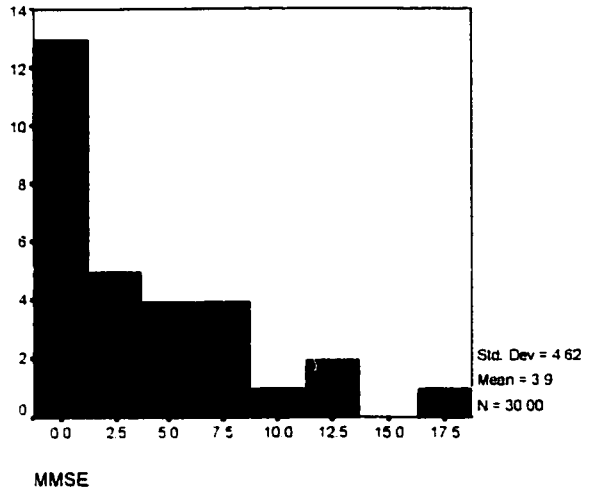
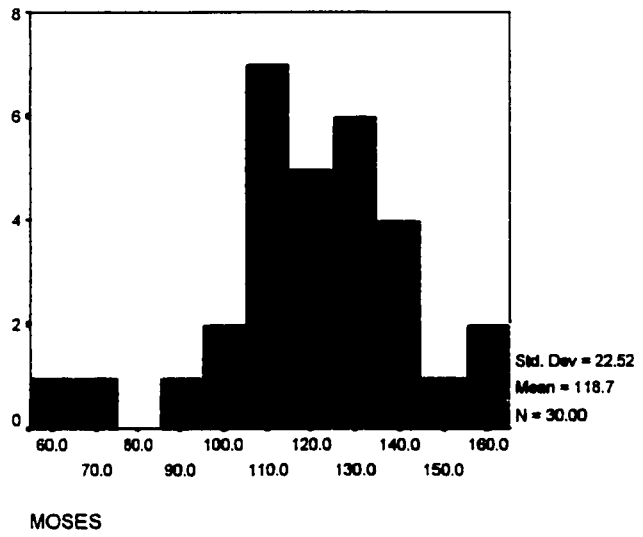


Figure 4: Distribution of scores on the MOSES (max = 178) (n = 30)



The distribution of scores are also shown in Table 2.

Table 2: The M-OSPD, MMSE, 3MS, and the MOSES scores of the participants

	Mean	**Std Dev**	**Min**	**Max**
M-OSPD (max = 55)	36.5	13.7	12	55 (1 person)
MMSE (max = 30)	3.9	4.6	0 (11 persons)	17
3MS (max = 100)	12.2	15.4	0 (7 persons)	57
MOSES (max = 178)	118.7	22.5	61	162

There were 11 out of 30 people who scored 0 on the MMSE and 7 out of 30 people who scored 0 on the 3MS. Only one person scored 55 out of 55 on the M-OSPD. There was a positive skewing in the distribution of the 3MS and MMSE scores.

Concurrent and Construct Validity

The correlation matrix of the four tests are presented in table 3.

Table 3: Correlation Matrix of the M-OSPD, MMSE, 3MS, and the MOSES scores

	M-OSPD	MMSE	3MS	MOSES
MMSE	.72 *			
Sig. (2-tailed)	.000			
N	30			
3MS	.72 *	.87		
Sig. (2-tailed)	.000	.000		
N	30	30		
MOSES	- .68 †	- .60	- .66	
Sig. (2-tailed)	.000	.000	.000	
N	30	30	30	

Note: All correlation coefficients are statistically significant at $p \leq 0.01$ level (2-tailed).
* Concurrent validity
† Construct validity

The concurrent validity, indicated by the r value of 0.72 between the 3MS and the M-OSPD scores was slightly less than the magnitude of 0.8 that was defined as acceptable apriori. However, this r value was statistically significant at $p \leq 0.01$ (2-tailed). It was also interesting to note that the correlation between the M-OSPD and the 3MS was the same as that between the M-OSPD and the MMSE.

The construct validity, indicated by the magnitude of the correlation coefficient r between the M-OSPD and the MOSES scores was 0.68. This exceeded the 0.4 acceptable limit that was set apriori. This r value was also statistically significant at $p \leq 0.01$ (2-tailed).

Summary

Thirty (30) continuing care residents were given the 3MS, the MMSE, and the M-OSPD. Their primary care nursing staff rated their behaviors and levels of function using the MOSES. Concurrent validity of the M-OSPD using the 3MS and the MMSE were 0.72. As a participant scored high on the M-OSPD (meaning that they had more residual cognitive abilities), he or she also scored high on the MMSE and 3MS (meaning that they had less cognitive impairment). The construct validity of the M-OSPD using the MOSES was - 0.68. As a participant scored high on the M-OSPD (meaning that they had more residual cognitive abilities), he or she scored low on the MOSES (meaning that they required less assistance from staff in terms of care).

CHAPTER 4

DISCUSSION

The purpose of this study was to evaluate the concurrent and construct validity of the M-OSPD for use with individuals in moderately late to late stage dementia. A total of 30 subjects in a continuing care setting in Edmonton participated in the study. The distribution of male (27%) and female (73%) subjects in this study was similar to the distribution of male (27%) and female (73%) nursing home residents in Canada (Statistics Canada, 1998); and male (25%) and female (75%) nursing home residents in the US, (Dey, 1997; Pamuk, Makuc, Reuben, & Lochner, 1998). All subjects in this study were in stages 5, 6 and 7 of the FAST. According to Molloy and Caldwell (1998), individuals in Stage 5 should not score higher than 17/30 on the MMSE. All of the subjects in this study scored 17 or less on the MMSE.

Concurrent validity, demonstrated by a correlation coefficient value of 0.72 between the 3MS and the M-OSPD, was slightly lower than the 0.80 criteria. Construct validity, demonstrated by a correlation coefficient magnitude of 0.68 between the MOSES and the M-OSPD, was considerably higher than the 0.40 criteria set apriori. Both coefficients for concurrent and construct validity were statistically significant.

The results suggest that, although the M-OSPD is a "cognitive test", it cannot entirely replace the 3MS due to low concurrent correlation. However, everyone could perform on the M-OSPD (i.e., minimum score was 12/55) while large numbers of subjects scored 0 on the two mental status tests (7 people scored 0 on the 3MS and 11 people scored 0 on the MMSE). Therefore, if a patient cannot achieve a score on

neither the 3MS nor the MMSE, the M-OSPD can be a reasonable substitute test for use with people in the late stages of AD.

In this study, the MMSE was administered along with the 3MS as suggested by the authors of the 3MS (Teng & Chui, 1987). Given the wider range of scores on the 3MS (i.e., out of 100), one would expect the correlation between the 3MS and the M-OSPD to be higher than the correlation between the MMSE (i.e., out of 30) and the M-OSPD. However, the two correlation coefficients were identical ($\underline{r}$ = .72). This could be explained by the fact that moderately late to late stage dementia patients were used in this study, and large numbers of subjects were in stages 6 & 7 of the FAST (n = 28). Since the 3MS was developed to provide a finer grading and wider range of scores for middle stage dementia patients (Teng & Chui, 1987), the 3MS did not improve scoring of these 28 people.

As expected, the MMSE and the 3MS showed convergent validity ($\underline{r}$ = 0.87). Also, the correlation coefficient between the 3MS and the MOSES ($\underline{r}$ = - 0.66) was similar to the correlation coefficient between the MMSE and the MOSES ($\underline{r}$ = - 0.60).

The MOSES, a functional-behavioural scale, was selected for evaluating the construct validity of the M-OSPD. The high correlation between the MOSES and the M-OSPD ($\underline{r}$ = - 0.68) suggested high convergent validity. This also indicated that either the MOSES contains more items that evaluate cognitive function, or that the M-OSPD items cover more functional-behavioural components than the author has initially estimated when setting the apriori convergent validity coefficient magnitude at $\underline{r}$ = 0.4. On the MOSES, items 9, 11 to 16, 26, and 34 to 38 appear to be evaluating cognitive function. Given that the correlations between the M-OSPD and the

cognitive tests (3MS and MMSE) were lower than expected, it is likely that the M-OSPD measures high degree of functional performances in addition to cognitive abilities.

Clinical Implications

The M-OSPD is unique as there is no other tool to assess residual cognitive capabilities in people with late stage AD. The results from this study have indicated that all subjects achieved a score on the M-OSPD as compared to the fact that 37% and 23% of all subjects failed to score on the MMSE and 3MS respectively. The inter-rater reliability of the M-OSPD has been demonstrated to be good by Auer et al. (1996). This study provided preliminary data on its concurrent and construct validity. Although the correlation values did not meet the criteria set apriori, they were statistically significant.

All 30 subjects were able to achieve a score on the M-OSPD and only 1 subject scored maximally on the M-OSPD (55/55). As the M-OSPD focuses on assessing how each resident reacts to various types of stimulation, it gives information on the environmental stimulation that can trigger responses from people in the late stages of AD. With the information from the M-OSPD, the concept of structuring the environment to support the need of people with AD can be extended to help people in the severe stages of AD.

Limitations of study

The results of this study should not be generalized to individuals with mixed dementia who may not deteriorate according to the hierarchical order of AD progression. Although the sample size exceeded the number required to achieve a power of 0.8 (see Appendix I), the numbers of subjects who failed to score on both the 3MS and MMSE reduce the amount of data available for calculating correlation thereby reducing the power of this study. Larger sample size would increase the power and possibly permit analyses between groups of subjects in each of the three stages of dementia.

As the M-OSPD emphasised optimal performance, the procedure of administering the test may introduce subjective bias from the examiner. This could be possible when the Research Assistant administered all three tests (i.e., M-OSPD, 3MS, and MMSE), and there is a possibility that she can predict how a subject would perform on the M-OSPD based on his or her performance on the 3MS/MMSE. The Research Assistant then only tested the subjects on the M-OSPD scale items that she predicted possible for the subjects. This may inadvertently introduce bias in term of inflating the r-value of concurrent validity in this study.

Research Implications

Clinically, the author noticed that it is difficult to clearly differentiate people with AD from others with mixed dementia. As the selection criteria for this study excluded people with mixed dementia (i.e., multi-infarct dementia), testing the discriminant validity of the M-OSPD for use with people with AD as well as with mixed dementia will be important. This will be helpful especially when people with

mixed dementia often lose their speech at an earlier point and the results of a discriminant study will advise clinicians whether the M-OSPD can be used as a complimentary test.

As the M-OSPD has a vital implication for clinical use, testing the feasibility of using the M-OSPD in program planning (i.e., if the results from the M-OSPD does indeed direct treatment) will also be needed.

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Appendix A

NINCDS – ADRDA Criteria for Alzheimer Disease

Definite AD

- ***Clinical criteria for probable AD***
- Histopathology of AD by biopsy or autopsy (microscopic evidence).

Probable AD

1. The **criteria** for the diagnosis of PROBABLE ALZHEIMER'S DISEASE **include**:

- Dementia by clinical examination, documented by neuropsychological testing, and established by medical history (typical onset, slow progression).
- Dementia with deficits in memory and one other area of cognition.
- No disturbance of consciousness.
- Onset between the ages of 40 to 90, most often after age 65; and
- Absence of systemic or other brain disorder causing dementia.

2. The diagnosis of PROBABLE ALZHEIMER'S DISEASE is **supported by**:

- Progressive deterioration of specific cognitive functions such as language (aphasia), motor skills (apraxia), and perception (agnosia).
- Impaired ADL and altered patterns of behaviours.
- Family history of similar disorders, especially if confirmed by brain autopsy results.
- Normal lab results, EEG results to rule out other systemic causes
- CT scan with evidence of cerebral atrophy with documentation of progressive deterioration by serial observation.

3. Other **clinical features consistent** with the diagnosis of PROBABLE ALZHEIMER'S DISEASE, after exclusion of dementia other than Alzheimer's Disease, include:

- Plateaus in the course of progression of the illness.
- Association with symptoms of depression, insomnia, incontinence, delusions, illusions, hallucinations, catastrophic verbal, emotional, or physical outbursts, sexual disorders, and weight loss.
- Other neurological symptoms seen in late stage, i.e., increased muscle tone, gait disorder, seizures although CT is normal for age.

NINCDS – ADRDA CRITERIA FOR ALZHEIMER DISEASE – Continued

4. Features that make the diagnosis of PROBABLE ALZHEIMER'S DISEASE **uncertain or unlikely** include:

- Sudden, apoplectic onset.
- Focal neurological findings such as hemiparesis, sensory loss, visual field deficits, and incoordination early in the course of the illness.
- Seizures or gait disturbances at the onset or very early in the course of the illness.

Possible AD

- Dementia with variations in onset or course, made on the basis of the dementia syndrome without other neurologic, psychiatric, or systemic disorders.
- Dementia with the presence of a second systemic or brain disorder
- Used in research when a single progressive severe cognitive deficit is identified in the absence of other identifiable cause.

References:

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Appendix B

DSM – IV DIAGNOSTIC CRITERIA FOR SPECIFIC DEMENTIA SYNDROMES

Dementia of the Alzheimer's Type

A. The development of multiple cognitive deficits manifested by both
   (1) memory impairment (inability to learn new information and to recall previously learned information)
   (2) one (or more) of the following cognitive disturbances:
      (a) aphasia (language disturbance)
      (b) apraxia (impaired ability to carry out motor activities despite intact motor function)
      (c) agnosia (failure to recognize or identify objects despite intact sensory function)
      (d) disturbance in executive functioning (i.e., planning, organizing, sequencing, abstracting)

B. The cognitive deficits in Criteria A1 and A2 each cause significant impairment in social or occupational functioning and represent a significant decline from a previous level of functioning.

C. The course is characterized by gradual onset and continuing cognitive decline.

D. The cognitive deficits in Criteria A1 and A2 are not due to any of the following:
   (1) central nervous system conditions that cause progressive deficits in memory and cognition (e.g., cerebrovascular disease, Parkinson's disease, Huntington's disease, subdural hematoma, normal pressure hydrocephalus, brain tumour)
   (2) systemic conditions that are known to cause dementia (e.g., hypothyroidism, vitamin B12 or folic acid deficiency, niacin deficiency, hypercalcemia, neuro-syphilis, HIV infection)
   (3) substance-induced conditions

E. The deficits do not occur exclusively during the course of a delirium.

F. The disturbance is not better accounted for by another Axis I disorder (e.g., Major Depressive Disorder, Schizophrenia).

American Psychiatric Association. (1994). Diagnostic and statistical manual of mental disorders. (4th ed.). Washington, DC: Author.

Appendix C

FUNCTIONAL ASSESSMENT STAGING (FAST) IN ALZHEIMER DISEASE (AD)*

FAST Stage**	Clinical Characteristics	Clinical Diagnosis
1	No decrement	Normal adult
2	Subjective deficit in word finding or recalling locations of objects	Normal aged adult
3	Deficits noted in demanding employment settings***	Compatible with incipient AD
4	Requires assistance in complex tasks (eg, handling finances, planning dinner party)***	Mild AD
5	Requires assistance in choosing proper attire***	Moderate AD
6a	Requires assistance dressing***	Moderately severe AD: with deficient activities of daily life
6b	Requires assistance bathing properly***	
6c	Requires assistance with mechanics of toileting (such as flushing, wiping)***	
6d	Urinary incontinence***	
6e	Fecal incontinence***	Moderately severe AD: with incontinence
7a	Speech ability limited to about a half-dozen intelligible words	
7b	Vocabulary limited to a single word	Severe AD: semiverbal
7c	Ambulatory ability lost	
7d	Ability to sit up lost	Severe AD: nonambulatory
7e	Ability to smile lost	Severe AD: immobile
7f	Ability to hold head up lost	

Reference: Reisberg, B. (1988). Functional Assessment Staging (FAST). Psychopharmacology Bulletin, 24, 653-659.

Appendix D

Global Deterioration Scale for Assessment of Primary Degenerative Dementia

Level	Clinical Characteristics
1 No cognitive decline	No subjective complaints of memory deficit. No memory deficit evident on clinical interview
2 Very mild cognitive decline (forgetfulness)	Subjective complaints of memory deficit, most frequently in the following areas: (a) forgetting where one has placed familiar objects; (b) forgetting names one formally knew well. No objective evidence of memory deficit on clinical interview. No objective deficits in employment social situations. Appropriate concern with respect to symtomatology.
3 Mild cognitive decline (Early confusional)	Earliest clear-cut deficits. Manifestations in more than one of the following areas: (a) patient may have gotten lost when travelling to an unfamiliar location; (b) co-workers become aware of patient's relatively poor performance; (c) word and name finding deficit becomes evident to intimates; (d) patient may read a passage or a book and retain relatively little material; (e) patient may demonstrate decreased facility in remembering names upon introduction to new people; (f) patient may have lost or misplaced an object of value; (g) concentration deficit may be evident on clinical testing. Objective evidence of memory deficit obtained only with an intensive interview. Decreased performance in demanding employment and social settings. Denial begins to become manifest. Mild to moderate anxiety accompanies symptoms.
4 Moderate cognitive decline (Late confusional)	Clear-cut deficit on careful interview. Deficits manifested in the following areas: (a) decreased knowledge of current and recent events; (b) may exhibit some deficit in memory of one's personal history; (c) concentration deficit elicited on serial subtractions; (d) decreased ability to travel, handles finances, etc... Frequently no deficit in the following areas: (a) orientation to time and person; (b) recognition of familiar persons and faces; (c) ability to travel to familiar locations. Inability to perform complex tasks. Denial is dominant defense mechanism. Flattening of affect and withdrawal from challenging situations occur.
5 Moderately severe cognitive decline (Early dementia)	Patient can no longer survive without some assistance. Patient is unable during interview to recall a major relevant aspect of their current lives, e.g., an address or telephone number of many years, names of close family members (i.e., grandchildren), names of high school or college from which they graduated. Frequently some disorientation to time (date, day). An educated person may have difficulty counting back from 40 by 4s or from 20 by 2s. Persons at this stage retain knowledge of many major facts regarding themselves and others. They invariably know their own names and generally know their spouses and children's names. They require no assistance with toileting and eating, but may have some difficulty choosing the proper clothing to wear.
6 Severe cognitive decline (Middle dementia)	May occasionally forget the name of the spouse upon whom they are entirely dependent for survival. Will be largely unaware of all recent events and experiences in their lives. Retain some knowledge of their past lives but this is very sketchy. Generally unaware of their surroundings, the year, the season, etc. May have difficulty counting from 10, both backward and sometimes forward. Will require some assistance with ADL, e.g., may become incontinent, will require travel assistance but occasionally will display ability to find familiar locations. Diurnal rhythm frequently disturbed. Almost always recall their own name. Frequently continue to be able to distinguish familiar from unfamiliar persons in their environment. Personality and emotional changes occur. These are quite variable and include: (a) delusional behavior, e.g., patients may accuse their spouse of being an impostor, many talk to imaginary figures in the environment, or to their reflection in the mirror; (b) obsessive symptoms, e.g., person may continually repeat simple cleaning activities; (c) anxiety symptoms, agitation, and even previously non-existent violent behavior may occur; (d) cognitive abulia, i.e., loss of willpower because of the inability to carry a thought long enough to determine a purposeful course of action.
7 Very severe cognitive decline (Late dementia)	All verbal abilities are lost. Frequently there is no speech at all, only grunting. Incontinent of urine, requires assistance with toileting and eating. Lose basic psychomotor skills, e.g., ability to walk. The brain appears to no longer able to tell the body what to do. Generalized and cortical neurological signs and symptoms are frequently present.

Reisberg, B., Ferris, S.H., Leon, M.J. & Crook, T. (1982). The global deterioration scale for assessment of primary degenerative dementia. American Journal of Psychiatry, 139, 1136-1139.

Appendix E

Brief Cognitive Rating Scale (BCRS)

Pt Name: _____ _____ Medication: _____
(code #)
Age: _____ Sex: ____ M ____ F
Diagnosis: _____
_____

Axis	Rating (Circle Highest Score)	Item
Axis I: Concentration	1 =	No objective or subjective evidence of deficit in concentration.
	2 =	Subjective decrement in concentration ability.
	3 =	Minor objective signs of poor concentration (e.g., on subtraction of serial 7s from 100).
	4 =	Definite concentration deficit for persons of their background (e.g., marked deficit on serial 7s; frequent deficit in subtraction of serial 4s from 40).
	5 =	Marked concentration deficit (e.g., giving months backwards or serial 2s from 20).
	6 =	Forgets the concentration task. Frequently begins to count forward when asked to count backwards from 10 by 1s.
	7 =	Marked difficulty counting forward to 10 by 1s.
Axis II: Recent Memory	1 =	No objective or subjective evidence of deficit in recent memory.
	2 =	Subjective impairment only (e.g., forgetting names more than formerly).
	3 =	Deficit in recall of specific events evident upon detailed questioning. No deficit in the recall of major recent events.
	4 =	Cannot recall major events of previous weekend or week. Scanty knowledge (not detailed) of current events, favorite TV shows, etc.
	5 =	Unsure of weather; may not know current President or current address.
	6 =	Occasional knowledge of some recent events. Little or no idea of current address, weather, etc.
	7 =	No knowledge of any recent events.
Axis III: Past Memory	1 =	No objective or subjective impairment in past memory.
	2 =	Subjective impairment only. Can recall two or more primary school teachers.
	3 =	Some gaps in past memory upon detailed questioning. Able to recall at least one childhood teacher and/or one childhood friend.
	4 =	Clear-cut deficit. The spouse recalls more of the patient's past than the patient. Cannot recall childhood friends and/or teachers but knows the names of most school attended. Confuses chronology in reciting personal history.
	5 =	Major past events sometimes not recalled (e.g., names of schools attended).
	6 =	Some residual memory of past (e.g., may recall country of birth or former ocupation).
	7 =	No memory of past.
Axis IV: Orientation	1 =	No deficit in memory for time, place, identity of self or others.
	2 =	Subjective impairment only. Knows time to nearest hour, location.
	3 =	Any mistake in time > 2 hrs; day of week > 1 day; date > 3 days.
	4 =	Mistakes in month > 10days or year > 1 month.
	5 =	Unsure of month and /or year and/or season; unsure of locale.
	6 =	No idea of date. Identifies spouse but may not recall name. Knows own name.
	7 =	Cannot identify spouse. May be unsure of personal identity.
Axis V: Functioning and And Self Care	1 =	No difficulty, either subjectively or objectively.
	2 =	Complains of forgetting location of objects. Subjective work difficulties.
	3 =	decreased job functioning evident to co-workers. Difficulty in traveling to new locations.
	4 =	Decreased ability to perform complex tasks (e.g., planning dinner for guests, handling finances, marketing, etc.).
	5 =	Requires assistance in choosing proper clothing
	6 =	Requires assistance in feeding, and/or toileting, and/or bathing, and/or ambulating.
	7 =	Requires constant assistance in all activities of daily life.

Reisberg, B., & Ferris, S. (1988). Brief Cognitive Rating Scale (BCRS). Psychopharmacology Bulletin, 24(4), 629-636.

Appendix F

(With permission from Dr. Auer, see Appendix K)

The *Modified Ordinal Scales for Psychological Development (M-OSPD)*© for Severe Dementia

Patient's name: _____

Evaluation date: ____/____/____

Evaluator: _____

Scale	Highest achieved scale step
I. Object Permanence	
II. Means-Ends	
III. Causality	
IV. Space	
V. Schemes	

Total *M-OSPD* score = _____
(sum of highest achieved scale steps)

Comments: _____

I. Object permanence (visual pursuit)

Patient's name _____ Evaluation date _____

	Items	Scale step	Score*	Comments
1.	Visual tracking: tracks object through a 180° arc.	1	___	_____
2.	Visual tracking: lingers at point of object's disappearance (*supine position*).	2	___	_____
3.	Visible displacement: secures partially hidden object.	3	___	_____
4.	Visible displacement: secures object hidden under a single screen.	5	___	_____
5.	Visible displacement: secures object hidden under one of two screens (*hidden alternately*).	6	___	_____
6.	Visible displacement: secures object hidden under one of three screens (*hidden alternately*).	7	___	_____
7.	Invisible displacement: secures object hidden with a single screen.	9	___	_____
8.	Invisible displacement: secures object hidden under one of two screens (*hidden alternately*).	11	___	_____
9.	Invisible displacement: secures object hidden under one of three screens (*hidden alternately*).	12	___	_____
10.	Successive invisible displacement: secures object hidden with three screens (*object left under first screen*) patient searches in reverse order.	14	___	_____

Highest Scale step achieved: _____

* Check (✔) if achieved, score an "X" if the patient is unable to perform the task.

(M-OSPD)©

II. Means-Ends

Patient's name _____ Evaluation date _____

Items	Scale step	Score*	Comments
1. Self stimulation: patient engages in self-stimulatory behavior.	1	___	_____
2. Secondary circular reaction: patient exhibits any repetitive movements or action directed towards an object or person reflecting orientation to a goal; i.e., waving arms to stop an action produced by examiner.	2	___	_____
3. Visually directed reaching: hand and object both in view.	3	___	_____
4. Multiple objects: drops one or both objects held in hands to obtain a third object.	5	___	_____
5. Locomotion: uses some form of locomotion as a means to obtain an out-of-reach object.	7	___	_____
6. String (vertical): uses string vertically to pull object up from floor.	10	___	_____
7. Solid ring: shows foresight by not stacking the solid ring.	13	___	_____

Highest scale step achieved: ___

* Check (✔) if achieved, score an "X" if patient is unable to perform the task

(M-OSPD)©

III. Causality

Patient's name _____ Evaluation date _____

Items	Scale step	Score*	Comments
1. Self stimulation: patient engages in self-stimulatory actions.	1	___	_____
2. Secondary circular reaction: patient exhibits any repetitive arm movements or action directed towards an object or a person (no grasping required).	2	___	_____
3. Response to an interesting spectacle created by agent: uses procedure as a causal action in response to a behavior created by an agent with or without the use of an object.	3	___	_____
4. Spectacle created by agent: patient is actively involved in the social exchange.	4	___	_____
5. Engages adult: patient initiates a social exchange or an activity with an object.	5	___	_____
6. Spectacle created by object: attempts to activate object following demonstration.	6	___	_____
7. Spectacle created by object: activation of mechanism-- no demonstration.	7	___	_____

Highest scale step achieved: ___

* Check (✔) if achieved, score an "X" if the patient is unable to perform the task

(M-OSPD)©

IV. Spatial construction

Patient's name _____ Evaluation date _____

Items	Scale step	Score*	Comments
1. Visual scanning: alternates glance between two visually presented objects.	1	___	_____
2. Sound localization: localizes the source of a sound.	3	___	_____
3. Visually-directed reaching: secures visually presented object.	4	___	_____
4. Follows trajectory: follows trajectory of objects falling within view.	5	___	_____
5. Follows trajectory: follows trajectory of objects falling out of view.	6	___	_____
6. Reverses object: patient rotates a three-dimensional object to see the functional side.	7	___	_____
8. Combining objects: patient places an object into a cup and dumps it out.	8	___	_____
9. Combining objects: patient is able to build a tower of two cubes.	9	___	_____
10. Indicates person's absence: indicates the absence of a familiar person.	11	___	_____

Highest scale step achieved: ____

* Check (✔) if achieved, score "X" if the patient is unable to perform the task

(M-OSPD)©

V. Schemes

Patient's name _____ Evaluation date _____

Items	Scale step	Score*	Comments
1. Mouthing: mouths object placed in the hand.	1	___	_____
2. Visual inspection: visually inspects objects, or people standing in front.	2	___	_____
3. Simple schemes: uses simple motor schemes.	3	___	_____
4. Examining: rotates object, examining all sides.	5	___	_____
5. Letting go: drops or throws object--visual monitoring of results of action/terminal location of object.	7	___	_____
6. Social actions: socially instigated and appropriate actions initiated by the patient.	8	___	_____
7. Showing: shows objects.	9	___	_____
8. Naming: spontaneously names objects, persons, actions, including self.	10	___	_____

Highest scale step achieved: ____

* Check (✔) if achieved, score an "X" if the patient is unable to perform the task

(M-OSPD)©

Appendix G

THE MODIFIED MINI-MENTAL STATE (3MS)

Client:_____Date:_____Examiner:_____

Diagnosis:_____Age:____ Education:_____

3MS **MMSE**

----------DATE AND PLACE OF BIRTH

/3 **Date**: year_____month___day_____

/2 **Place**: city (town)_____province_____

----------REGISTRATION (No. of presentations_____) **Time:**

_____

/3 /3 **SHIRT, BROWN, HONESTY**

(Options: SHOES, BLACK, MODESTY or: SOCKS, BLUE, CHARITY)

----------MENTAL REVERSAL

5 to 1

/2 Accurate

/1 1 or 2 errors / misses

/5 /5 **DLROW** (Spelling WORLD backward)

----------FIRST RECALL **Time:**

_____

/9 /3 Spontaneous recall

/6 After "Something to wear" or "A color" or "A good personal quality"

/1 "SHOES", "SHIRT", "SOCKS"

/1 "BLUE", "BLACK", "BROWN"

/1 "HONESTY", "CHARITY", "MODESTY"

3MS	MMSE	
		TEMPORAL ORIENTATION
		Year
/8	/1	Accurate
/4		Missed by 1 year
/2		Missed by 2 - 5 years
		Season
/1	/1	Accurate or within 1 month
		Month
/2	/1	Accurate or within 5 days
/1		Missed by 1 month
		Day of month
/3	/1	Accurate
/2		Missed by 1 - 2 days
/1		Missed by 3 - 5 days
/1	/1	**Day of week**
		SPATIAL ORIENTATION
/2	/1	**Country**
/1	/1	**Province**
/1	/1	**City (town)**
/1	/1	**Hospital/Office/Home (name of building)**
	/1	**Floor**
		NAMING
	/2	(MMS: Pencil_____, Watch_____)
/5		Forehead_____, Chin_____, Shoulder_____
		Elbow_____, Knuckle_____

3MS **MMSE**

/10 **Four-legged animals** (30 seconds) 1 point each

_____ _____ _____ _____

_____ _____ _____ _____

_____ _____

----------**SIMILARITIES**

Arm-Leg

/2 Body part; limb; etc.

/1 Less correct answer

Laughing-Crying

/2 Feeling; emotion

/1 Other correct answer

Eating-Sleeping

/2 Essential for life

/1 Other correct answer

----------**REPETITION**

"I WOULD LIKE TO GO HOME/OUT"

/2 Correct repetition

/1 1 or 2 missed / wrong words

/3 /1 **"NO IFS _____ ANDS _____ OR BUTS _____"**

----------**READ AND OBEY** **"CLOSE YOUR EYES"**

/3 /1 Obeys without prompting

/2 /1 Obeys after prompting

/1 Read aloud only (spontaneously or by request)

----------**WRITING** (1 minute)

/5 **"I WOULD LIKE TO GO HOME/OUT".**

/1 Spontaneous sentence

3MS MMSE

----------COPYING TWO PENTAGONS (1 minute)

	Each pentagon		
	5 appropriate equal sides	4	4
	5 unequal (> 2:1) sides	3	3
	Other enclosed figure	2	2
	2 or more lines	1	1
	Intersection		
	4 corners	2	
	Not-4-corner enclosure	1	
/10 /1			

----------THREE-STAGE COMMAND

/3 /3 _____ **TAKE THIS PAPER WITH YOUR LEFT/RIGHT HAND**

_____ **FOLD IT IN HALF, AND**

_____ **HAND IT BACK TO ME**

----------SECOND RECALL **Time:**

_____

/9 Spontaneous recall

/6 After "Something to wear" or "A color" or "A good personal quality"

/1 "SHOES", "SHIRT", "SOCKS"

/1 "BLUE", "BLACK", "BROWN"

/1 "HONESTY", "CHARITY", "MODESTY"

Teng, E. L., & Chui, H. C. (1987). The Modified Mini-Mental State (3MS) Examination. Journal of Clinical Psychiatry, 48(8), 314-318.

Appendix H

THE MULTIDIMENSIONAL OBSERVATION SCALE FOR ELDERLY SUBJECTS (M.O.S.E.S.)

Instructions For Raters

1. **Read over the Scale:**

Before starting to observe any residents, please read over the 40 questions that make up the scales several times so that you will know the types of behaviors to watch for. Then, you can go through them again in more detail with a particular resident in mind. When rating the number of times a behavior occurs, (for example, "seldom"or "often"), please use the specific meaning for the word given right below it.

2. Period of Observation:

Only the resident's daytime behaviors (those he or she engages in from the early morning at about 7 a.m. until he or she goes to bed at night at about 9 p.m.) **should be considered**. You should **only rate behaviors that you have seen (or that were reported to you) during the period of observation**. Behaviors that occurred before this time, or behaviors that you think the resident might be capable of, should not be considered. Ask other staff, if needed, about behaviors that you may not have seen.

3. Filling in the Rating Form:

For each of the 40 questions, pick the one alternative that you feel **best describes the resident, and just circle it.** Please try to answer all of the questions although it may seem that some of the questions are not appropriate for the residents in your institution.

MOSES Items

PLEASE BE SURE TO ANSWER EVERY QUESTION.

FOR EACH QUESTION CHOOSE THE ALTERNATIVE THAT **BEST** DESCRIBES THE RESIDENT'S BEHAVIOR DURING THE **DAYTIME** IN THE PAST WEEK, EXAMPLES ARE FREQUENTLY GIVEN TO HELP YOU MAKE YOUR DECISIONS.

I – 1. DRESSING

On most days in the past week, the resident:

1. Initiated and completed dressing without staff supervision
2. Dressed with only minor supervision (for example, had his clothes laid out or had to be reminded to dress.
3. Partly dressed himself, but needed frequent staff assistance
4. Was either totally dressed by staff or remained in bedclothes

I – 2. BATHING (Include baths and showers)

When bathing in the past week, the resident:

1. Prepared and completed his own bathing without staff supervision
2. Bathed himself with only minor supervision (i.e., had towel and soap set out or water run, or needed urging to get started).
3. Partly bathed himself, but needed frequent staff assistance (i.e., needed parts of his body washed or towel-dried).
4. Was totally bathed by staff

I – 3. GROOMING (include care of hair, nails, teeth, and shaving).

In the past week, the resident:

1. Completed all aspects of grooming without staff supervision.
2. Looked after certain aspects of grooming independently, but needed staff supervision or assistance with other aspects.
3. Helped with parts of his grooming, but needed frequent staff assistance with all aspects of his grooming.
4. Was totally groomed by staff.

I – 4. INCONTINENCE (of either urine or feces)

In the past week, how often was the resident incontinent?

1. Not at all.
2. Only during the night
3. Occasionally during the daytime
4. Frequently during the daytime (more than once a day)

I – 5. USING THE TOILET

Most of the times that he did use the toilet in the past week, the resident:

1. Initiated going to and properly used the toilet without staff supervision
2. Used the toilet with only minor supervision (for example, had to be reminded to go or reminded to wipe, or occasionally made a mess on the floor)
3. Helped with his toileting, but needed frequent staff assistance (for example, needed help in taking down pants, wiping, getting on and off the toilet).
4. Was totally toileted by staff (had to be lifted on and off the toilet. Include use of bed pans, and staff attended catheters or colostomies.)

I - 6. PHYSICAL MOBILITY

On most days in the past week, when getting around inside the building, the resident:

1. Walked without any assistance
2. Moved independently with mechanical assistance (for example, walked alone with a cane or walker or crutches, or propelled himself in a wheelchair).
3. Walked with the physical assistance of staff
4. Remained bedfast or chairfast (chairfast refers to residents who were moved from bed to a chair during the daytime, but otherwise were quite immobile.)

I - 7. GETTING IN AND OUT OF BED

On most days in the past week, the resident:

1. Got in and out of bed without any type of physical assistance.
2. Got in and out of bed independently of staff, but with the help of some equipment (for example, using a trapeze or sliding board by himself)
3. Got in and out of bed with the physical assistance of staff
4. Remained in bed all day.

I - 8. USE OF RESTRAINTS (for example, bed rails, soft ties, or Geri-chairs.)

How often during the daytime in the past week were restraints used with this resident?

1. Not at all
2. Seldom (on one to three days for only short periods of time)
3. At times (either on more than three days for only short periods of time, or on one to three days for most of the day)
4. Often (on more than three days for most of the day)

II - 9. UNDERSTANDING COMMUNICATION (either speaking, writing, or gesturing)

Most of the times that you communicated with resident in the past week, he:

1. Understood clearly
2. Understood only brief communications (such as short sentences or gestures)
3. Understood brief communications only if they were repeated
4. Did not understand any communications

II - 10. TALKING

Most of the times that the resident spoke during the past week, his speech:

1. Was coherent and logical
2. Began logically, but he wandered off the topic while talking
3. Sounded coherent, but his conversation was irrelevant (for example, his speech was unrelated to the question being asked or the event taking place)
4. Made very little sense (for example, word jumbles or meaningless phrases or meaningless noises)
5. Question does not apply – the resident did not speak in the past week.

II - 11. FINDING WAY AROUND INSIDE (For example, ability to find his room, the washroom, the dining room)

How often during the daytime in the past week, did the resident become disoriented (confused) in finding his way around the inside of his residence?

1. Not at all
2. Seldom (only one to three times during the week)
3. At times (either once or twice a day on more than three days, or several times a day on one to three days)
4. Often (several times a day on more than three days)
5. Question does not apply – resident never moved around inside the building without assistance from the staff.

II – 12. RECOGNIZING STAFF

On most days in the past week, the resident:

1. Recognized several members of the staff by name or by exact role (for example, Doctor or Nurse or Physiotherapist)
2. Recognized one or two members of the staff by name or by exact role
3. Could tell members of the staff apart from residents or visitors, but didn't know the name or exact role of any staff members
4. Could not tell members of the staff apart from residents or visitors.

II – 13. AWARENESS OF PLACE

During the past week, the resident:

1. Knew exactly where he was living (knew the institution's name and the city or town where it is located)
2. Knew the type of place he was living in, but was confused about its name or location
3. Sometimes seemed to understand the type of place he was living in, but at other times was confused about this.
4. Was confused about the type of place he was living in (for example, thought he was living at home or somewhere else)
5. This information could not be obtained – the resident did not communicate appropriately.

II – 14. AWARENESS OF TIME

Consider whether on most days in the past week the resident was aware of (a) the year (within 1), (b) the season, and (c), the approximate time of day (for example, whether it was morning or after lunch or after supper)?

1. He was aware of all three (year, season, and time of day)
2. He was aware of two of the three
3. He was aware of one of the three
4. He was confused about all three
5. This information could not be obtained – the resident did not communicate appropriately

II – 15 . MEMORY FOR RECENT EVENTS (day to day events such as recreation, meals, visits occurring within the past week).

During the past week, the resident:

1. Could remember most recent events clearly
2. Could remember most recent events, but in a vague way
3. Could remember some recent events, but completely forgot others
4. Seemed to forget most events a few minutes after they occurred.
5. This information could not be obtained – the resident did not communicate appropriately

II – 16. MEMORY FOR IMPORTANT PAST EVENTS (For example, his year of birth, his past occupation, names of members of his family and whether they are still living)

During the past week, the resident:

1. Could easily remember many past events correctly
2. Could remember many pasty events correctly, but with some effort
3. Could remember some past events, but forgot others
4. Was confused about most events in his past life
5. This information could not be obtained – the resident did not communicate appropriately

III – 17. LOOKING SAD AND DEPRESSED (For example, looking gloomy, unhappy, mournful. Do not include looking bored, indifferent, worried or anxious.)

How often during the past week did the resident look sad and depressed?

1. Not at all
2. Seldom (on one to three days for only short periods of time)
3. At times (either on more than three days for only short periods to time, or on one to three days for most of the day)
4. Often (on more than three days for most of the day)
5. Could not tell – the resident has some facial paralysis or physical problem (for example, Parkinsonism) which gives his face a gloomy look

III – 18. REPORTING SADNESS AND DEPRESSION (Talking about being sad or depressed or wanting to be somewhere else. Do not include complaints about his care. Also do not include talking about being worried.)

How often during the past week did the resident say (or write) something to indicate that he was sad or depressed?

1. Not at all
2. Seldom (only one to three times during the week)
3. At times (either once or twice a day on more than three days, or several times a day on one to three days)
4. Often (several times a day on more than three days. Also include her any resident who specifically said he wanted to be dead.)
5. Question does not apply – the resident did not speak (or write) in the past week.

III – 19. SOUNDING SAD AND DEPRESSED (Using a tone of voice when speaking that suggests sadness or depression, or making sad noises like moans or sighs. Do not include sounding angry or worried or in acute pain.)

How often during the past week did the resident sound sad and depressed?

1. Not at all
2. Seldom (on one to three days for only short periods of time)
3. At times (either on more than three days for only short periods of time, or on one to three days for most of the day)
4. Often (on more than three days for most of the day)
5. Question does not apply – the resident did not speak or make any sounds in the past week.

III – 20. LOOKING WORRIED AND ANXIOUS (Do not include looking sad and depressed.)

How often during the past week did the resident look worried, tense, and anxious?

1. Not at all
2. Seldom (on one to three days for only short periods of time)
3. At times (either on more than three days for only short periods of time, or on one to three days for most of the day)
4. Often (on more than three days for most of the day)

III – 21. REPORTING WORRY AND ANXIETY (Talking about being worried about certain things. Do not include talking about being unhappy.)

How often during the past week did the resident say (or write) something to indicate that he was worried or anxious about something?

1. Not at all
2. Seldom (only one to three times during the week)
3. At times (either once or twice a day on more than three days, or several times a day on one to three days)
4. Often (several times a day on more than three days)
5. Question does not apply – the resident did not speak (or write) in the past week.

III – 22. CRYING (Do not include moaning or sighing or yelling.)

How often during the past week did the resident cry?

1. Not at all
2. Seldom (on one to three days for only short periods of time)
3. At times (either on more than three days for only short periods of time, or on more than three days of long periods of time)
4. Often (on more than three days for long periods of time).

III – 23. PESSIMISM ABOUT THE FUTURE (Talking about the future being hopeless or unbearable, or about how things will not improve)

How often during the past week did the resident say (or write) something to indicate that he felt pessimistic about his future?

1. Not at all
2. Seldom (only one to three times during the week)
3. At times (either once or twice a day on more than three days, or several times a day on one to three days)
4. Often (several times a day on more than three days)
5. Question does not apply – the resident did not speak (or write) in the past week.

III – 24. SELF-CONCERN

How often during the past week did the resident have trouble concentrating on events happening to him or around him because he was so upset or concerned about his troubles?

1. Not at all
2. Seldom (only one to three times during the week)
3. At times (either once or twice a day on more than three days, or several times a day on one to three days)
4. Often (several times a day on more than three days)

IV – 25. CO-OPERATION WITH NURSING CARE (Co-operation with feeding, bathing, grooming, and medication)

On most days in the past week, when interacting with nurses and orderlies the resident:

1. Actively co-operated in his own care (attempted to help and participate when possible.)
2. Passively co-operated in his own care (quietly allowed himself to be cared for)
3. Resisted care attempts in a minor way (would give an initial argument or whine or physical resistance, but quickly gave in)
4. Resisted care attempts in a major way (getting him to co-operate was a real chore)

IV – 26. FOLLOWING STAFF REQUESTS AND INSTRUCTIONS

Most of the requests or instructions made by the staff of the resident in the past week:

1. Were followed without resistance or resentment
2. Were followed without resistance but with quiet resentment (for example, were responded to with quiet muttering or nasty looks)
3. Were responded to with an argument or physical resistance before being complied with
4. Were responded to with resistance and finally had to be physically enforced by the staff
5. Were not understood by the resident (include residents who were so mentally or physically disabled that staff never gave them even simple instructions.)

IV – 27. IRRITABILITY

How often during the past week was the resident irritable and grouchy?

1. Not at all
2. Seldom (only one to three days for short periods of time)
3. At times (either on more than three days for short periods of time, or on one to three days for most of the day)
4. Often (on more than three days for most of the day)

IV – 28. REACTIONS TO FRUSTRATION (Reacting with abuse or shining when his requests were denied or when he had to wait for something.)

During the past week, when the resident experienced frustrations, how often did he lose his temper?

1. Not at all
2. Seldom (only one to three times during the week)
3. At times (either once or twice a day on more than three days, or several times a day on one to three days)
4. Often (several times a day on more than three days)

IV – 29. VERBAL ABUSE OF STAFF (Include yelling at, swearing at, cursing, threatening.)

How often during the past week did the resident verbally abuse staff members?

1. Not at all
2. Sometimes
3. Frequently (at least once a day on more than three days) when asked to do something he didn't want to do
4. Frequently (at least once a day on more than three days) with no apparent provocation or cause.
5. Question does not apply – the resident did not speak or make any sounds in the past week.

IV – 30. VERBAL ABUSE OF OTHER RESIDENTS (Include yelling at, swearing at, cursing, threatening.)

How often during the past week did the resident verbally abuse other residents?

1. Not at all
2. Sometimes
3. Frequently (at least once a day on more than three days) when they interfered with him
4. Frequently (at least once a day on more than three days) with no apparent provocation or cause.
5. Question does not apply – the resident either did not speak or had no access to other residents

IV – 31. PHYSICAL ABUSE OF OTHERS (Hitting or shoving other residents or staff)

How often during the past week did the resident physically strike anyone?

1. Not at all
2. On one occasion, after being provoked
3. On one occasion, without apparent cause or provocation
4. More than once (include residents who actually had to be put in restraints to keep them from striking others)
5. Question does not apply – the resident is physically incapable of striking someone

IV – 32. PROVOKING ARGUMENTS WITH OTHER RESIDENTS

How often during the past week did the resident start or provoke an argument with another resident?

1. Not at all
2. Seldom (only one to three times during the week)
3. At times (either once or twice a day on more than three days, or several times a day on one to three days)
4. Often (several times a day on more than three days)
5. Question does not apply – the resident had no access to other residents

V – 33. PREFERRING SOLITUDE (Keeping to himself)

When not receiving physical care in the past week, did the resident seem to prefer being left alone?

1. No. He always enjoyed company when it was available.
2. He seemed indifferent about whether he had company or was left alone
3. At least some of the time he actively discouraged company
4. Most of the time he actively discouraged company

V – 34. INITIATING SOCIAL CONTACTS (By speaking or gesturing or smiling first, or by approaching)

In the past week, the resident:

1. Frequently (several times a day on more than three days) initiated social contacts with both staff members and other residents.
2. Frequently (several times a day on more than three days) initiated social contacts with either staff or other residents, but not both.
3. Sometimes initiated social contacts with either staff or other residents
4. Never initiated social contacts with either staff or other residents

V – 35. RESPONDING TO SOCIAL CONTACTS (Do not consider simply following instructions or looking at the person as responding to social contacts.)

How often during the past week did the resident respond to social contacts made by other people?

1. Most of the time, and tried to keep the contact going (for example, by continuing the conversation or holding on to the person)
2. Most of the time, but only briefly (for example, simply answered the question or nodded or smiled but made no effort to keep the contact going)
3. Only some of the time (under half of the time that others tried to make contact)
4. Not at all

V – 36. FRIENDSHIPS WITH OTHER RESIDENTS

In the past week, the resident:

1. Was close friends with more than one other resident (this implies a real relationship.)
2. Was close friends with only one other resident
3. Established a casual friendship with at least one other resident (for example, tagged along with for a while, but no real bond)
4. Did not have any type of friendship with another resident
5. Question does not apply – the resident had no access to other residents

V – 37. INTEREST IN DAY-TO-DAY EVENTS (For example, watching, or listening and reacting to things going on around him)

In the past week, how often did the resident pay active attention to the things happening around him?

1. Often (on more than three days for most of the day)
2. At times (either on more than three days for only short periods of time, or on one to three days for most of the day).
3. Seldom (on one to three days for only short periods of time)
4. Not at all

V – 38. INTEREST IN OUTSIDE EVENTS (For example, taking an interest in the activities of his family and absent friends, or news or sports)

In the past week, how often did the resident seem to take any interest in events happening outside of his residence?

1. Daily
2. Some days
3. Rarely (for example, he might show mild interest in his family, but only to be concerned about future visits)
4. Not at all

V – 39. KEEPING OCCUPIED (On his own, by reading, actively watching the T.V. or listening to radio, at hobbies, chatting with others, going for walks. Do not include organized recreational activities.)

How often during the past week did the resident keep himself occupied on his own?

1. Often (on more than three days for most of the day)
2. At times (either on more than three days for only short periods of time, or on one to three days for most of the day).
3. Seldom (on one to three days for only short periods of time)
4. Not at all

V – 40. HELPING OTHER RESIDENTS (Include any kind of help that seems to reflect concern for the other person; for example, physically helping them or comforting or entertaining them.)

How often during the past week did the resident volunteer to help other resident?

1. Often (several times a day on more than three days)
2. At times (either once or twice a day on more than three days)
3. Seldom (only one to three times during the week)
4. Not at all
5. Question does not apply – the resident was either physically immobile (needed staff assistance to move around inside) or was kept in restraints on most days.

Helmes, E., Csapo, K.G., & Short, J. (1987). Standardization and validation of the Multidimensional Observation Scale for Elderly Subjects (MOSES). Journal of Gerontology, 42(4), 395-405.

Appendix I
SAMPLE SIZE CALCULATION

(Cohen, 1988)

From Power Table 3.4.1 (p. 101):

At an alpha level of $a_1 = .05$ (or $a_2 = .10$) and a study power of .95, where a correlation coefficient of 0.8 is desired,

n = 11 is required for each group in the t test of Pearson r comparison.

This study, therefore, needs approximately 22 participants.

With the same alpha level of .05 and r = 0.8, n = 15 can be used to increase the power of the study from .95 to .99.

Cohen, J. (Ed.). (1988). The significance of a Product Moment r_s. In Statistical power analysis for the behavioral sciences (pp. 775-107). (2nd ed.). New Jersey: Lawrence Erlbaum Associates, Inc.

Appendix J

University of Alberta
Edmonton
Canada T6G 2G4

Faculty of Rehabilitation Medicine
Rehabilitation Research Centre
3-48 Corbett Hall
Director (403) 492-7856 Telephone (403) 492-2903
Fax (403) 492-1626

UNIVERSITY OF ALBERTA HEALTH SCIENCES FACULTIES, CAPITAL HEALTH AUTHORITY, AND CARITAS HEALTH GROUP

HEALTH RESEARCH ETHICS APPROVAL

Date: January 1998

Name(s) of Principal Investigator(s): Judy Quach

Organization(s): University of Alberta

Department: Graduate Studies, Department of Occupational Therapy

Project Title: The validity and clinical use of the Modified Ordinal Scale of Psychological Development.

The Health Research Ethics Board has reviewed the protocol for this project and found it to be acceptable within the limitations of human experimentation. The HREB has also reviewed and approved the patient information material and consent form.

The approval for the study as presented is valid for one year. It may be extended following completion of the yearly report form. Any proposed changes to the study must be submitted to the Health Research Ethics Board for approval.

Sharon Warren

Dr. Sharon Warren
Chair of the Health Research Ethics Board (B: Health Research)

File number: B-080198-REM

Appendix J

Health Research Ethics Board | biomedical research | health research

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University of Alberta, Edmonton, Alberta T6G 2R7
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Edmonton, Alberta T6G 2G4
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UNIVERSITY OF ALBERTA HEALTH SCIENCES FACULTIES,
CAPITAL HEALTH AUTHORITY, AND CARITAS HEALTH GROUP

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Sharon Warren

Dr. Sharon Warren
Chair of the Health Research Ethics Board (B: Health Research)

File number: B-080198-REM

Appendix J

The CAPITAL CARE *Group*
LEADERS IN CONTINUING CARE

#500, 9925 - 109 Street
Edmonton, Alberta T5K 2J8
Telephone: [403] 448-2400
Facsimile: [403] 429-2217

September 25, 1997

Ms. Judy Quach
7360 - 178 Street
Edmonton, Alberta
T5T 2H4

Dear Ms. Quach

Re: The Validity and Clinical Use of the Modified Scale of Psychological Development

The Capital Care *Group* Research and Evaluation Review Committee reviewed your proposal on September 22, 1997. I am pleased to confirm that the Committee has granted approval to this study from an ethical and scientific viewpoint.

We have approved the proposal based on a few modifications, as outlined below:

- limit co-signature to family member or guardian
- if a resident refused participation, we request that only the demographic data be used up to that point
- the proposal requires a faculty member signature
- the consent form needs to be revised to a lower level of literacy with the original kept in a central Capital Care Lynnwood file and copies for the resident/family and research project.

We would appreciate a report on an annual basis and on completion of this study. Any changes in your consent form protocols must be submitted to the Research and Evaluation Review Committee.

Sincerely,

Caroline Clark
Chair, Research and Evaluation Review Committee

CC/ml

cc: Alice Sears, Administrator, Capital Care Lynnwood

l-jq-pd/research

Appendix J

University of Alberta
Edmonton
Canada T6G 2G4

Department of Occupational Therapy
Faculty of Rehabilitation Medicine
2-64 Corbett Hall, Telephone (403) 492-2499
Fax (403) 492-1626

Appendix J

Judy Quach
7360 - 178 Street
Edmonton, AB, T5T 2H4

Ms. Caroline Clark
Chair, Research and Evaluation Review Committee
The Capital Care Group
#500, 9925 - 109 St.
Edmonton, AB, T5K 2J8

September 29, 1997

Re: The validity and clinical use of the Modified Scale of Psychological Development (M-OSPD)

Dear Ms. Clark and the Research and Evaluation Review Committee,

Thank you for the letter of September 25, 1997 informing me that my thesis research proposal has received ethical approval by your committee. I have addressed all of the suggestions given by the ethics review committee:

1. I will only record the reason for withdrawal of consent (should the resident refused participation and should this be possible) and will not need to use any of their information that is collected up to that point.
2. I have limited the co-signature to family member or guardian.
3. Dr. Lili Liu (thesis supervisor) will send a letter of support for my study, if required. She will also sign any document related to the proposal.
4. I have changed the informed consent form to a lower level of literacy, from grade 8 to grade 6.4 (please see attached).

Thank you again for your support. The data collection and analysis of the study should be completed around May, 1998 and your committee will receive a final report.

Sincerely Yours,

Judy Quach
Graduate Student in M.Sc. (OT)

Appendix J

INFORMATION SHEET

Title of Project: The Validity and Clinical Use of the Modified Ordinal Scales of Psychological Development (M-OSPD).

Researcher: Judy Quach, B Sc. O.T. (Master Thesis Candidate), phone: 484-0456.

Supervisor: Dr. Lili Liu, Ph. D. O.T., phone: 492-5108.

Dear _____,

This is a study for a Master of Science thesis. We are looking at the usefulness of a new test for the people who have advanced Alzheimer Disease. This test is called the Modified Ordinal Scale of Psychological Development (M-OSPD). We would appreciate it if you would allow us to use this test on

_____ .

This study will compare how your _____ does on the M-OSPD with how he (or she) does on two other commonly used tests: the Folstein's Mini Mental Status Examination (MMSE), and the Modified Mini Mental Status (3MS). These two tests are already used at Lynnwood. All three tests will be given by Irene Karantanis. Each test will take about 25 minutes to finish. If _____ gets tired, he (or she) may continue the assessment on another day. A nurse will also do the Multidimensional Observation Scale for the Elderly Subjects (MOSES) to observe your _____'s abilities throughout the day. There is no known risks to participating in this study.

Your time and assistance will help decide whether this test is more useful than the currently used tests. You will receive a summary of these findings. If you have questions about how _____ does, Judy Quach or Irene Karantanis will talk with you immediately after the test. All information about your _____ will be kept confidential. Only the research team, Judy's thesis committee members, the ethics review committee, and funding agency (ies) have access to this study. Although group results will be published, your _____'s name will not appear in any of these results. Data will be stored in a locked filing cabinet and will be destroyed seven years after the study is finished.

Your _____ participation in this study is totally voluntary and that you may withdraw from the study at any time. Withdrawal from the study will not affect your _____'s care in any way. Should you have any further concern and wish to speak to someone outside of this study, you may contact Dr. Anne Rochet, Associate Dean of Graduate Studies and Research, Faculty of Rehabilitation Medicine at 492-2903.

Thank you for considering this request.

_____ _____

Family's Initial Researcher's Initial

CONSENT FORM
(For family)

Tittle: The Validity and Clinical Use of the Modified Ordinal Scales of Psychological Development (M-OSPD)

Researcher: Judy Quach, Occupational Therapist
Master's Candidate
Capital Care Lynnwood
(403) 484-0456

Thesis Advisor: Dr. Lili Liu (Thesis Supervisor)
Department of Occupational Therapy
Faculty of Rehabilitation
University of Alberta
(403) 492-5108

I understand that my spouse/family member has been asked to be in a research study.	Yes	No
I have read and received a copy of the attached Information Sheet.	Yes	No
I understand the benefits and risks involved for my spouse/family member in taking part in this research study.	Yes	No
I have had an opportunity to ask questions and discuss this study.	Yes	No
I understand that both my spouse/family member and I are free to refuse to participate or withdraw from the study at any time. I do not have to give a reason and it will not affect his/her care.	Yes	No
The issue of confidentiality has been explained to you. I understand who will have access to your spouse/family member's records.	Yes	No

This study was explained to me by: _____

I agree to let my spouse/family member take part in this study.

_____ _____

Signature of Family/Guardian of the Research Participant — Date

_____ _____

Signature of Interviewer — Date

_____ _____

Signature of witness — Date

_____ _____

Signature of Participant (optional) — Date

CONSENT FORM (OPTIONAL)
(For residents)

Tittle: The Validity and Clinical Use of the Modified Ordinal Scales of Psychological Development (M-OSPD)

Investigator: Judy Quach, Occupational Therapist
Master's Candidate
Capital Care Lynnwood
(403) 496-2537

Thesis Advisor: Dr. Lili Liu (Thesis Supervisor)
Department of Occupational Therapy
Faculty of Rehabilitation
University of Alberta
(403) 492-5108

Do you understand that you have been asked to be in a research study? Yes No

Have you read and received a copy of the attached Information Sheet? Yes No

Do you understand the benefits and risks involved in taking part in this research study? Yes No

Have you had an opportunity to ask questions and discuss this study? Yes No

Do you understand that you are free to refuse to participate or withdraw from the study at any time? You do not have to give a reason and it will not affect your care. Yes No

Has the issue of confidentiality been explained to you? Do you understand who will have access to your records? Yes No

This study was explained to me by: _____

I agree to take part in this study.

_____ _____

Signature of Participant, if applicable Date

_____ _____

Signature of Interviewer Date

_____ _____

Signature of witness Date

Appendix K

Aging and Dementia Research Center
Department of Psychiatry (THN 314)
New York University Medical Center
550 First Avenue, New York, NY 10016
(212) 263-5700 Fax: (212) 263-6991

Judy Quach
7360-178 street
Edmonton, AB, Canada
T5T 2H4

Dear Ms. Quach,

February 19, 1998

This is in response to your request to use the Modified Ordinal Scales of Psychological Development (M-OSPD) on which I hold the copyright in your research project. This scale is regularly licensed to commercial entities for a fee. However, I am pleased to permit academic researchers to use the Scale in support of their research at no fee upon the following advanced understand.

I am giving you permission to use the M-OSPD scale on the understanding that it will be used for your research study , and that you will not a) reproduce or duplicate this Scale, except for this research project (b) alter, revise, modify, or change the Scale, prepare any program, software, or other product, incorporating, based upon or deriving from the Scale, (d) rewrite the Scale, or adapt it in any way to circumvent the need for obtaining permission for its use; (e) distribute, transfer, or otherwise make available the Scale, or any part of the Scale, to any other person or entity except your employees or persons under your supervision for the purposes of your research; (f) use the Scale, or any party of it, as the basis for any commercial product, or incorporate the Scale, or any part of it, into any commercial product, or incorporate the Scale, or any part of it, into any commercial product; or (g) permit or authorize any other person or entity to do any of the

Appendix K

foregoing.

Any reproduction of this scale in any form, publication or presentation should be identified as "©Stefanie Auer and Barry Reisberg, Not to be reproduced without permission of authors". This permission to use the Scale commences as of the date this letter signed by you is received by me and terminates at the conclusion of this research project.

If these conditions are acceptable to you, please sign below and return this letter to me for my files. I am looking forward to learning the results of your interesting research project.

Sincerely

Stefanie Auer, Ph.D.

Agreed : _____ Date: Mar 04, 1998