# TEST BATTERY FOR THE DIAGNOSIS OF DEMENTIA IN INDIVIDUALS WITH INTELLECTUAL DISABILITY

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**and**

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Abstract

A working battery of tests for the diagnosis of dementia in adults with intellectual disability is proposed by an international group of experts with research and clinical experience. The battery, consistent with the current state-of-the-art, includes scales for informant report of functioning and tests for direct assessment. The working group recommends widespread use of the battery as part of both ongoing and new longitudinal research and in clinical practice. It is believed that widespread use of a common battery will enhance communication and collaborative opportunities among researchers and clinicians at various sites. The collaborative evaluation of such a battery will address one of the greatest challenges in the field, that of differentiating change associated with aging from that associated with dementia.

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# Test Battery for the Diagnosis of Dementia in Individuals with Intellectual Disability

The "elderly" population with intellectual disability (ID) has grown dramatically during recent decades, and dementia associated with old age has emerged as a significant concern. Unfortunately, knowledge about both aging and dementia in this population is limited, and standardized methods for the identification of clinically significant changes in status among elderly adults are not yet available. This report addresses this issue by proposing a state-of-the-art battery of tests that were selected to determine the presence or absence of dementia. The proposed test battery is the result of a multi-step process carried out by an international working group on the assessment of dementia in individuals with ID. The charge of the working group was to stimulate new work and dialogue on the assessment of dementia in adults with ID. To achieve this goal the following short-term aims were identified: (1) establish working diagnostic criteria for dementia in this population (Aylward, Burt, Thorpe, Lai, & Dalton, 1997), and (2) identify a consensus battery that could be used to determine whether individuals meet the proposed diagnostic criteria (Janicki, 1994). The purpose of this report is to present the consensus battery identified and modified by the working group.

It is important to note that the proposed battery is not intended to be the only viable method for assessment, but a battery that can be used for both research and clinical purposes to determine whether diagnostic criteria for dementia are met. Multi-site, longitudinal administration of the proposed scales in well-defined samples will provide data for independent assessment of their validity. The working group anticipates that other newly developed or alternative scales or tests will also continue to be investigated. The collaborative evaluation of the recommended battery will address

one of the greatest challenges in the field, that of differentiating change associated with aging from that associated with dementia. Similarly, in clinical practice, the administration of a broad common battery to all healthy adults with ID will provide information regarding baseline levels of functioning for later comparative purposes, should a timely clinical assessment of decline/change be needed for service and care planning.

The Consensus Process

Consensus on the proposed battery was achieved over several years in the following way. First, working group members and other individuals working in the area were invited to submit a list of all scales or tests that could be useful in a dementia battery. Each list included the following information for each instrument: experience with the scale, assessment of instrument's utility for diagnosing dementia in adults with ID, and normative information. A cumulative list of all submitted tests was then distributed to all working group members, who were asked one year later to make suggestions for a consensus battery. Based on working group input, the list was narrowed to 2-3 scales per functional area (e.g., memory, language). All scales were then critically evaluated at a working group meeting on the basis of the experience and knowledge of the members. Final recommendations resulted in the battery described here.

Although a consensus battery is presented, it is important to note that complete working group consensus was not achieved regarding the most appropriate assessment scale(s) for all skill areas described. The extent to which consensus was reached for the various skill areas appeared to depend upon a number of factors, including number of available scales in a given area (e.g., memory, fine motor), extent of shared experience with a proposed scale, extent to which

experiences with a given scale were consistent (i.e., all positive, some positive and others negative), and differences in judged usefulness of a scale for adults with varying levels of ID. For example, the number of identified memory scales adapted for use in adults with ID was large, with little overlapping experience with given scales. In contrast, for the assessment of fine and perceptual motor skills, few tests were available and shared experience on the tests led to a clear choice of one test over another. In the areas of memory and adaptive functioning, final consensus was not reached at the work group meeting, but in follow-up subcommittee discussions. For all areas of functioning, any expressed reservations about scales are presented in the relevant sections.

Criteria for Final Selection of Scales and Tests

Our major criterion for selection of tests to include in the battery was the test's capacity to assess performance in individuals ranging from the mild to profound range of ID. For example, tests that can yield scores indicating floor despite some ability to perform tasks (e.g., IQ-equivalent scores of "<36" on the Stanford-Binet) are not very helpful for assessing dementia, as it is impossible to document decline in individuals whose baseline score is below the floor. Preference was given to instruments developed for use with individuals with ID and, when possible, normed on this population. Unfortunately, few tests met these criteria. As a result, most of the tests that were selected were originally developed for assessment of children or adults with dementia in the general population. We attempted to select tests whose content would not be considered too juvenile for adults with ID. In addition, tests or scales that were normed on adults with ID, but that were appropriate only for individuals with higher levels of functioning (e.g., self-report psychopathology scales) were not recommended, because they would become inappropriate if declines

in functioning led to changes in level. There was a lack of agreement at times, however, regarding whether recommended tests were appropriate for lower functioning individuals, suggesting the need for more research into this area. Preference was given to tests that had demonstrated reliability, at least in samples of individuals without ID. It was also important to select tests that could be administered quickly, such that the total administration time would not be excessive for a single office visit. We also selected tests that would not be prohibitively expensive.

An attempt was made to select tests that cover a wide range of neuropsychological functions and behavioral domains, particularly those that are addressed by the diagnostic criteria for dementia in individuals with ID (Aylward et al., 1997). Unfortunately, it is not yet known which neuropsychological functions decline most rapidly in individuals with ID who are becoming demented. In addition, as in the general population, area of decline would be expected to vary depending upon the cause of dementia and the premorbid profile of strengths and weaknesses.

It is currently impossible to specify those individual tests that will yield the greatest longitudinal changes in individuals with ID as they dement. While attempting to select tests that cover most aspects of neuropsychological functioning, we have sampled particularly heavily from tests that assess memory, as this is the cognitive domain in which the greatest decline is observed in individuals without ID who are becoming demented. (e.g., Moss, Albert, Butters, & Payne, 1986; Albert, Moss, & Milberg, 1989; Welsh, Butters, Hughes, Mohs, & Heyman, 1991).

**TABLE I. Instruments Administered to Individuals with ID:**

| in of Cognitive oning | Instrument | Approximate Time to Administer | Reference |
|---|---|---|---|
| l Status | Test for Severe Impairment (modified) | 10 minutes | Albert & Cohen, 1992 |
| ry (without : | Stanford Binet Sentences<br><br>Fuld (modified)<br>Spatial Recognition Span | 5 minutes<br><br>10 minutes<br>5 minutes | Thorndike et al., 1986<br>**Appendix A**<br>Moss, et al., 1986 |
| ry (with delay) | Fuld (modified) | 10 minutes | **Appendix A** |
| iographical ry | (see list of questions) | 5 minutes | **Appendix A** |
| ation | (see list of questions) | 5 minutes | **Appendix A** |
| sive Language | Boston Naming<br><br>McCarthy Verbal Fluency | 5 minutes<br><br>5 minutes | Kaplan et al., 1978<br><br>McCarthy, 1972 |
| tive Language | Simple commands | 5 minutes | **Appendix A** |
| Motor Speed | Purdue Pegboard (modified) | 5 minutes | Tiffin & Asher, 1948 |
| tual Motor | Developmental Test of Visual Motor Integration | 5 minutes | Beery & Buktenica, 1997 |

Dementia Battery

The proposed neuropsychological battery is divided into two sections: scales to be administered to informants and tests to be administered to the individual with ID. The working group strongly recommends that information from both sources be used when making a diagnosis of dementia (Aylward et al., 1997). Informant report instruments have been included that indirectly assess orientation, everyday memory and other cognitive functioning, adaptive and maladaptive behaviors, and psychiatric symptoms. Instruments have also been included that directly assess cognitive functioning in a formal testing setting. The test battery is designed to be used as part of an assessment procedure that includes a physical examination to identify possible causes of decline (e.g., hypothyroidism, reaction to medications), as well as other appropriate medical tests

(e.g., neuroimaging, vision and hearing).

**Scales Administered to Informants**

To diagnose dementia in individuals with ID it is imperative to obtain information from someone who is familiar with the individual's current daily behavior and, preferably, also familiar with the individual's behavior in the past. It is sometimes difficult, however, to identify the most appropriate person to interview, especially for individuals who live in institutions or in group homes with multiple care providers. When possible, it is recommended that multiple informants be questioned, particularly care providers or supervisors from several different settings (e.g., group home, place of employment, family) who may be familiar with various aspects of the history and current functioning of the individual being assessed (Gedye, 1995; Reiss, 1987). Of course, the informants selected for the interview should be those who possess knowledge of the skills and behaviors being rated. Such informants are usually those who have known the individual longest, and who have the greatest amount of contact with him or her. To complete the recommended interview, knowledge is required concerning: (a) everyday memory, other cognitive abilities (e.g., expressive and receptive language), and orientation skills; (b) maladaptive behaviors (i.e., their severity, pervasiveness, duration, and any treatment history); and (c) adaptive skills (e.g., personal, daily living, and vocational skills). The clinician conducting the interviews should clearly note how long the informant has known the individual with ID and in what context (e.g., type of setting, number of hours of contact per week) so that discrepancies among reports from various informants over time can be more fully understood. At times, serious disagreements occur in behavioral ratings among different informants at the same observation. For clinical purposes, further investigation and

information gathering (e.g., direct observation of the discrepantly reported behavior in various settings, self-report in higher functioning individuals) would thus be indicated. For research purposes, a system for integrating data from multiple informants must be devised (e.g., separate recording, a formula weighting information by informant or scale).

In addition, to minimize variability in reported performance from assessment to assessment, informants should be assured that it is permissible to say they are unable to respond to specific questions. (Occasionally, a scale specifically states that an informant should estimate particular skills or behaviors of which they have no direct knowledge, in which case the informant should be encouraged to respond.) For some individuals, the skill could be assessed by having the informant request the information from the adult with ID (e.g., how old are you?), by requesting that a skill be performed (e.g., tie your shoes) or in a follow-up call to the informant once the skill has been observed (e.g., crosses the street looking both ways). For some lower functioning or nonverbal individuals, it is often difficult to report whether they possess a given skill assessed on a scale (e.g., remembers events from his/her youth). Of course, the working group recommends that standardized procedures be followed for all scales. However, if “don’t know” responses are not allowed on a scale, the interviewer should take note of the informant’s level of uncertainty and make a judgment as to whether enough valid information was obtained to interpret the score(s) from the scale. As noted previously, scales were chosen to represent the broadest range of functioning possible, but they cannot all be expected to apply to all individuals, as discussed in subsequent sections.

Instruments designed for administration to an informant that are recommended for the

battery include:

*(a) Dementia Questionnaire for Mentally Retarded Persons (DMR)* (Evenhuis, Kengen, & Eurlings, 1990; Evenhuis, 1992, 1996). This is a screening instrument for the diagnosis of early dementia in adults with ID. Although this instrument was designed as a questionnaire to be completed by the informant, working group members recommend that it be administered as a structured interview. This will allow the examiner to make certain that the respondent understands the items and will provide the examiner with a more thorough understanding of the individual's functioning and the informant's certainty regarding level of functioning. The informant responds "yes," "sometimes," or "no" to 50 items indicating whether skills are present in eight areas: short-term and long-term memory, orientation (spatial and temporal), speech, practical skills, mood, activity/interests, and behavioral disturbance. This instrument is designed to assess adults at all levels of intellectual disability, although there was some concern among working group members regarding its appropriateness for individuals in the severe and profound ranges of intellectual functioning, as these individuals may not ever have been able to perform many of the skills covered by the questionnaire (also see Evenhuis, 1996). Experienced evaluators reported that the interview takes about 15 minutes. Reliability and validity data are available (Evenhuis, 1992, 1996). As with most instruments, this questionnaire is designed to assess current functioning, and thus on the basis of one assessment does not indicate whether there has been any change over time. Although absolute cut-off scores are provided for diagnosis on the basis of a single administration (Evenhuis, 1992, 1996; Prasher, 1997), the working group believes that longitudinal administration is necessary for any type of diagnosis of dementia. Cut-off scores indicative of clinically significant changes in

functioning over time are available (Evenhuis, 1996), but there is some concern regarding excessive false positives in adults with behavior problems, and regarding low sensitivity and specificity in general (Prasher, 1997). Therefore, cut-off scores for dementia should be used cautiously and in conjunction with information gathered from other scales. Although there is considerable debate at this time regarding DMR cut-off scores and administration procedures (e.g.,Prasher, 1997), the scale is the only short informant dementia scale with normative data for adults functioning in the mild and moderate ranges of ID. In addition, it assesses orientation skills, which other brief scales do not.

(b) *Dementia Scale for Down Syndrome* (DSDS). (Gedye, 1995). Although the title of this instrument implies that it is appropriate only for individuals with Down syndrome, working group members have also found it to be a useful screen for dementia in adults with other forms of ID. The scale consists of 60 items which reflect behaviors that may be present at each of three stages of dementia (early, middle late). Two informants are interviewed by a psychologist, with administration discontinued at the end of a stage if a specified number of behaviors indicative of dementia are not reported up to that point. The informants report whether behaviors were typical of the individual during adulthood, whether they are currently present or absent, and approximate onset of the behavior, if it is known. The psychologist is able to obtain a dementia rating that is independent of the individual's premorbid level of intelligence, indicating whether the person is demented and, if so, the stage of dementia (early, middle, or late). Items are included in the scale to assist in identifying potentially treatable reasons for decline (e.g., depression, sensory handicaps, thyroid disease). Administration of the scale takes 15 to 30 minutes, with less time needed if behaviors are not present.

The scale is designed to be administered before dementia is suspected, and to be re-administered at least every year. Six-month follow-up is required if any signs of dementia are reported. Reliability and validity data are available for adults with profound and severe levels of ID (Gedye, 1995), although the scale's sensitivity for individuals functioning at levels higher than that of the normative sample has not been documented. This scale has the advantage of focusing on changes that would be indicative of dementia. However, the informant is required to compare current to previously recalled levels of functioning, and working group members expressed concerns about the reliability of such retrospective data. As with other instruments, it is imperative that the scale be administered at least once before dementia is suspected, and then longitudinally at regular intervals. Finally, despite the stated advantages of the DSDS, working group members raised concerns regarding the logistics and expense of administering it according to the developer's specifications (i.e., the requirement that it be administered and interpreted only by a psychologist, the difficulty of identifying two reliable informants for each individual, the feasibility of re-administration of the interview after six months, and difficulty with applying scoring criteria based on information supplied in the manual).

(c) *Reiss Screen for Maladaptive Behavior* (Reiss, 1987). Although not sufficient by itself to warrant a diagnosis of dementia, evidence of emotional/motivational change is necessary to meet diagnostic criteria for dementia. In addition to documenting such change, screening for maladaptive behavior is important because changes in the behavioral domain may precede changes in the cognitive domain and maladaptive behaviors may signify causes for cognitive decline (e.g., depression) that are reversible (Burt, in press). The Reiss Screen is considered to be the best screen for

psychopathology in adults with ID (Aman, 1991), and it is the only scale currently available that is normed on individuals at all levels of ID. It is administered in the form of a questionnaire to informants, who indicate whether 38 behaviors are "no problem," a "problem," or a "major problem." Administration time is approximately 5 to 15 minutes. Scoring yields a profile of possible psychiatric diagnoses. Working group members were concerned about the specificity of the diagnoses that are obtained (Aman, 1991), with particular concern regarding items on the depression scale. In addition, like all available psychopathology scales, the Reiss Screen is not designed to detect dementia. Thus, problem behaviors could be reported that are secondary to dementia rather than indicative of a co-occurring psychiatric disorder. For these reasons, it is recommended that the instrument be used to screen for the presence or absence of any form of psychopathology. If psychopathology is detected and dementia is also suspected, it is recommended that the individual be referred for a full differential diagnostic evaluation performed by a clinician with expertise in ID (Burt, in press; Evenhuis, in press; Thorpe, in press). To obtain information relevant to a diagnosis of dementia, it is important to document whether maladaptive behaviors represent change from previous functioning or whether they have always been present. In addition it should be noted whether maladaptive behaviors co-occur with cognitive declines, or whether the cognitive declines reverse partially or completely in the absence of the maladaptive behaviors. Although a thorough behavioral history could be obtained from the informant retrospectively, longitudinal administration of the instrument should yield more valid data.

(d) *Adaptive Behavior Scales.* To assess declines in adaptive behavior, several working group members recommend the Scales of Independent Behavior - Revised (SIB-R) (Bruininks, Woodcock, Weatherman, & Hill, 1996) or one of its derivatives (i.e., the Inventory for Client and Agency

Planning (ICAP). Several others recommend the AAMR Adaptive Behavior Scale Residential and Community (2nd Ed.) (ABS-RC:2) (Nihira, Leland, & Lambert, 1993). Information on both scales is presented here.

(d.1) *Scales of Independent Behavior - Revised (SIB-R)* (Bruininks et al., 1996). The SIB-R assesses adaptive behavior in four domains and maladaptive behavior in three domains. Based on a normative sample of individuals in the general population who were between 0 and 90 years of age, it yields a cluster score, an age equivalent, percentile, and standard score for each adaptive domain and a standard score for each maladaptive domain. It also provides a score which reflects overall independence based on adaptive and maladaptive behavior combined, a support score indicating level of services required, and supplemental scores based on performance of a group of children and adults with handicaps. It has good reliability and validity. An interview format is recommended, with an interview easel to aid the informant in following the response format. The informant rates the individual's adaptive skills on a four-point scale from "never does independently" to "does very well." Basal and ceiling rules are followed so that all adaptive scale items do not have to be administered. Maladaptive behavior scores are based on both the pervasiveness and severity of a given behavior. Working group members find that the interview takes from 40 to 60 minutes, depending on the informant's familiarity with the scale. For detecting change over time, it is recommended that domain raw scores be used in addition to the score reflecting overall independence. A previous version of the SIB-R (Burt et al., in press) detected declines related to the later stages of dementia in individuals with DS, and its derivative, the ICAP was successfully used in an interview format in a longitudinal study on aging and dementia in adults with DS (G. Seltzer, personal communication, June, 1997).

(d.2) _AAMR Adaptive Behavior Scale Residential and Community (2nd Ed.) (ABS-RC:2)_ (Nihira, et al., 1993). The ABS-RC:2 assesses independent functioning in 10 domains (Part One), and maladaptive behavior in eight domains (Part Two). It yields a raw score for each domain, in addition to a percentile based on a normative sample of individuals with ID. Part One of the previous version of this scale (ABS, Nihira, Foster, Shellhaas, & Leland, 1974) has adequate reliability and validity (Spreat, 1982). For adults with DS, cross-sectional findings indicate that highest ABS Part One total raw scores are obtained when they were in their 30's, suggesting that the highest level of adult adaptive performance could, on average, be obtained during this decade for this particular group (Prasher & Chung, 1996). Although the ABS was found to differentiate between groups with DS with no dementia and those with moderate to severe dementia, it did not differentiate between healthy individuals and those with mild to moderate dementia (Prasher, Chung, & Haque, in press; Prasher, Krishnan, Clarke, & Corbett, 1994). Whether this failure to detect early dementia indicates a lack of sensitivity in this adaptive behavior scale, or whether changes in adaptive behavior are only typical of later stages of dementia in adults with DS (Burt et al., in press) remains to be determined. Poor inter-rater reliability has been reported for some domains of Part Two of the ABS (Spreat, 1982). Given historical difficulties in reliably rating maladaptive behaviors in individuals with ID (Spreat, 1982), the use of the ABS-RC:2 Part Two in conjunction with the Reiss Screen and the dementia scales will provide several sources of information. Any inconsistencies in maladaptive behaviors reported across scales would indicate the need for follow-up investigation, using direct observation if possible.

Working group members who have used the ABS-RC:2 (or its previous version) recommend that it be administered in a semi-interview format. That is, sitting side by side the informant is

asked to follow along in the examination booklet as the interviewer introduces each item. The interviewer provides the format for each of the items (e.g., "which one of these statements best describes the individual's highest writing abilities?", "circle all statements that describe the individual's table manners"), allows the informant to read all of the statements, and provides clarification as needed. This semi-interview format is believed to minimize informant fatigue, frustration, and confusion with the scale, which were found to result if either a strict completion or interview format were followed. To examine change over time, it is recommended that Part One domain raw scores, and Part One and Two total scores be used.

(e) Stress Index. (G. Seltzer, personal communication, November 17, 1997). Administration of a life events scale is recommended to record environmentally based circumstances that may affect cognitive/behavioral functioning. On the Stress Index (Appendix A), an informant is asked whether any of 11 events have occurred for the individual in the last year, and if so whether the event was positive or negative. Although some individuals will have obvious reactions to life events (e.g., significant increases in maladaptive behavior, significant withdrawal), others could react in less obvious ways that could nevertheless affect cognitive/adaptive functioning. If declines in functioning are found after the occurrence of major life events, the declines could be partly or totally associated with a transient state associated with the trauma, and not with an underlying progressive disease process. The developer of the Stress Index also recommends that it be administered directly to adults with ID to obtain their own perspectives (G. Seltzer, personal communication, November, 1997). The index included in the Appendix can be modified for use with adults who demonstrate that they answer Yes-No questions in a valid way (i.e., responding correctly to questions regarding their likes and dislikes, to which the interviewer knows the answer).

# APPENDIX A:

## Stress Index, Autobiographical Memory, Orientation, and Simple Commands and Modified Fuld Object Memory Evaluation

## STRESS INDEX

Adapted from Stress Index used by G. Seltzer in DS & Aging Study)

Administered to: ___ Informant ___ Individual with ID Date: ________________

Name: _____________________ Interviewer: __________________

**Instructions** (read to informant or individual with ID, and fill in name blank as appropriate)
I'm going to read you a list of things that can happen to people. Please let me know if any of these things have happened to ________ (name of individual/you) in the last year or so. If it happened, I will ask you if it was a good thing or if you feel that it was a bad thing.
Note: If the individual with ID does not understand any wording, or if deemed appropriate it is O.K. to simplify wording (e.g., change "because of illness" to "because you were sick"). Make a note if anyone interviewed appeared to have difficulty answering the questions. Because of possible response bias to yes-no questions, compare informant information to that provided by the individual with ID, and be sure to ask questions regarding nature of event in "good **or** bad" format.

| | YES | NO | IF YES GOOD or BAD |
|---|---|---|---|
| 1. Did ___ have a serious illness? | ___ | ___ | ________________ |
| 2. Did ___ go to the hospital because of illness | ___ | ___ | ________________ |
| 3. Did a friend or relative go to the hospital? | ___ | ___ | ________________ |
| 4. Did a friend or relative die? | ___ | ___ | ________________ |
| 5. Did ___ move? | ___ | ___ | ________________ |
| 6. Did a friend or relative of ___ move away? | ___ | ___ | ________________ |
| 7. Did ___ get a new roommate or house supervisor? | ___ | ___ | ________________ |
| 8. Did ___ lose a job, quit a job, or retire? | ___ | ___ | ________________ |
| 9. Did ___ get a new job? | ___ | ___ | ________________ |
| 10. Did ___ have money problems? | ___ | ___ | ________________ |
| 11. Did ___ have any other problems not mentioned? | ___ | ___ | ________________ |

## AUTOBIOGRAPHICAL MEMORY:

Administration: For each item on this test, the question should first be asked in a recall format, as indicated (e.g., "What is your name?"). If there is no correct response, the item should be repeated as a multiple choice item requiring a verbal response (e.g., "Is your name Chris, [subject's name], or Pat?"). If there is still no correct response, or if the individual is known to be nonverbal, the item should be repeated as three individual yes-no items (e.g., "Is your name

Chris?" "Is your name [subject's name]?" "Is your name Pat?", with the examiner waiting for a response (e.g., head nod) to each question.
Scoring: Adults receive either 2 points (pts) for correct recall (says item when asked), or 1 pt for recognition in either the multiple choice (choice of items) or yes/no format (nods or says yes or no). If adult receives full credit for any item (recall = 2 pts), move on to the next item (i.e., skip recognition).

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1. *What is your name?*
   Points:________

*(0-4 points)*

[Sum points for first and last name (either 2, 1, or 0 for each as indicated)]

Recall:
First name correct: ____yes ____no (2 pts)
Last name correct: ____yes ____no (2 pts)

If adult gives first name only (e.g., "Tom,"), say "Tom what? What is your last name?"
(Two points each for correct first and last name.)

Recognition - First name:
If adult gives wrong answer or no answer for first name, ask:

Is your name Chris*, [subject's first name], or Pat*?

Correct verbal response? ____yes ____no (1 pt)

*IF NO CORRECT RESPONSE*:
Correct responses to all three "yes"/"no" questions? ____yes ____no (1 pt)

Recognition - Last name:
If adult gives wrong answer or no answer for last name, ask

Is your last name Smith*, Jones*, or [adult's last name]?

Correct verbal response? ____yes ____no (1 pt)

*IF NO CORRECT RESPONSE*:
Correct responses to all three "yes"/"no" questions? ____yes ____no (1 pt)

2. *When is your birthday?*
Points:________
*(0-6 points)*
__________________________________[Sum points for month, day, and year (either 2, 1, or 0 for each as indicated)] Recall:

Month correct: ____yes ____no (2 pts)
Day correct: ____yes ____no (2 pts)
Year correct: ____yes ____no (2 pts)

If adult gives month and day only, say "What year were you born?"

Recognition - Month of birth:
If adult does not respond or gives wrong information for month of birth, ask

Is your birthday in [correct month], [month before correct month], or [month before correct month]?
(e.g., if adult was born in April, ask whether s/he was born in April, March, or February)

Correct verbal response? ____yes ____no (1 pt)

*IF NO CORRECT RESPONSE*:
Correct responses to all three "yes"/"no" questions? ____yes ____no (1 pt)

If adult does not recognize correct answer, tell him/her the month of his/her birth.

Recognition - Day of birth:
If adult does not respond or gives wrong information for day of birth, ask

Is your birthday on [correct month/one day before correct date], [correct month/correct date], or [correct month/one day after correct date]?
(e.g., if adult was born on April 28, ask whether s/he was born on April 27, April 28, or April 29)

Correct verbal response? ____yes ____no (1 pt)

*IF NO CORRECT RESPONSE*:
Correct responses to all three "yes"/"no" questions? ____yes ____no (1 pt)

Recognition: Year of birth:
If adult does not respond or gives wrong information for year of birth, ask

Were you born in [one year before correct birth year], [correct birth year], or [one year after correct birth year]? (e.g., if adult was born in 1954, ask whether s/he was born in 1953, 1954, or 1955)

Correct verbal response? ____yes ____no (1 pt)

*IF NO CORRECT RESPONSE*:
Correct responses to all three "yes"/"no" questions? ____yes ____no (1 pt)

3. *How old are you?*
Points:________

*(0-2 points)*

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Recall:
Correct within one year: ____yes ____no (2 pts)

Recognition:
If adult does not respond or does not give age within one year, ask

Are you [correct age], [correct age minus 2], or [correct age plus 2]?
(e.g., if adult is 42, ask whether s/he is 42,40,44)

Correct verbal response? ____yes ____no (1 pt)

*IF NO CORRECT RESPONSE*:
Correct responses to all three "yes"/"no" questions? ____yes ____no (1 pt)

**TOTAL SCORE FOR AUTOBIOGRAPHICAL MEMORY:** ____________
(0-12 points)
[Sum 1 + 2 + 3]

**ORIENTATION**

Administration and Scoring: See Autobiographical Memory

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1. . *What day of the week is it?*
Points:________

*(0-2 points)*

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______________________ Recall:
____Correct ____Incorrect (2 pts)

Recognition:
If adult does not respond or gives wrong day of the week, ask

Is today [correct day], [one day before correct day], or [one day after correct day]?
(e.g., if it is Monday, ask whether today is Monday, Sunday, or Tuesday)

Correct verbal response? ____yes ____no (1 pt)

*IF NO CORRECT RESPONSE*:
Correct responses to all three “yes”/“no” questions? ____yes ____no (1 pt)

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2. *What month is it?*
Points:________

*(0-2 points)*

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______________________ Recall:
_____Correct _____Incorrect (2 pts)

Recognition:
If adult does not respond or gives wrong month, ask

Is today [one month before month], [correct month], or [one month after correct month]?
(e.g., if it is April, ask whether it is March, April, or May)

Correct verbal response? ____yes ____no (1 pt)

*IF NO CORRECT RESPONSE*:
Correct responses to all three “yes”/“no” questions? ____yes ____no (1 pt)

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3. *What day of the month is it?*

Points:________

*(0-2 points)*

____________________ Recall:

____Correct ____Incorrect (2 pts)

Recognition:

If adult does not respond or gives wrong date, ask

Is today [one day before date], [one day after correct date],or [correct date]?
(e.g., if it is the 28th, ask whether it is the $27^{th}$, $29^{th}$, or $28^{th}$)

Correct verbal response? ____yes ____no (1 pt)

*IF NO CORRECT RESPONSE*:
Correct responses to all three “yes”/“no” questions? ____yes ____no (1 pt)

4. *What year is it?*

Points:________

*(0-2 points)*

_______________ Recall:

____Correct ____Incorrect (2 pts)

Recognition:

If adult does not respond or gives wrong date, ask

Is this year [correct year], [one year after correct year], or [one year before correct year]?
(e.g., if it is the 1998, ask whether it is the 1998, 1999, or 1997)

Correct verbal response? ____yes ____no (1 pt)

*IF NO CORRECT RESPONSE*:
Correct responses to all three “yes”/“no” questions? ____yes ____no (1 pt)

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*5. Where are we right now?*
Points:________

*(0-2 points)*

---

_______________ Recall:
(Note where assessment is being done):______________________________________________

Institution/building/address (*patient's response*):____________________________________
(*If at an institution, adult must give the name of the institution or name of the building. If at adult's residence, ask for address*)

_____Correct _____Incorrect (2 pts)

Recognition:
If adult does not respond or gives the wrong location, ask:

Are you at home, at a grocery store, or at the doctor's office
[or other correct location]?
____yes _____no (1 pt)

Correct verbal response? ____yes ____no (1 pt)

*IF NO CORRECT RESPONSE*:
Correct responses to all three "yes"/"no" questions? ____yes ____no (1 pt)

*6. What city/town do you live in?*
Points:________

*(0-2 points)*

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_______________ Recall:
____Correct ____Incorrect (2 pts)

Recognition:

If adult does not respond or gives the wrong city/town, ask

Do you live in [Columbus]*, [correct city/town], or [Springfield]*?

Correct verbal response? ____yes ____no (1 pt)

*IF NO CORRECT RESPONSE*:
Correct responses to all three "yes"/"no" questions? ____yes ____no (1 pt)

---

7. *What state* do you live in?*
Points:________

*(0-2 points)*

---

Recall:
____Correct ____Incorrect (2 pts)

Recognition:
If adult does not respond or gives the wrong state, ask

Do you live in [correct state], [Alaska]*, or [Vermont]*?

Correct verbal response? ____yes ____no (1 pt)

*IF NO CORRECT RESPONSE*:
Correct responses to all three "yes"/"no" questions? ____yes ____no (1 pt)

*If "incorrect" answers happen to be correct for patient (i.e., patient's name is Pat, Chris, Smith, or Jones, or patient lives in Columbus, Springfield, Alaska, or Vermont), make up and record alternative responses that are incorrect for the patient. If this list of questions is being administered outside of the United States, modify the names and places as appropriate.

**TOTAL SCORE FOR ORIENTATION:__________________**

*(0 – 14 points)*
[Sum 1-7]

## SIMPLE COMMANDS

For this test you will need a small rubber ball (approximately 1" in diameter), a small toy dump truck which can hold the ball, and a key. The ball and the key may be the same as for the Fuld Object Memory Evaluation.

Place the ball, key, and truck in front of adult, spaced about 1 foot apart. Repeat all commands after incorrect response or nonresponse. Record all responses. Discontinue after 3 consecutive failures to either respond correctly or to correct a wrong response. (i.e., if adult corrects an incorrect response after repetition, a score of 0 is given, but it does not count towards discontinuation.) Score: 2 points if correct on first command, 1 point if correct after repetition for non-response, 0 points if correct after repetition for incorrect response.

On repetition of the first 3 commands, they can be reworded as "show me the__" or "Which one is the___?" or simply saying the name of the object.

_____Touch the ball

_____Touch the truck

_____Touch the key

_____Give me the truck

_____Touch the key then the ball

_____Touch the truck then the key

_____Put the ball in the truck

_____Put the key next to the ball

_____Touch the truck with the key

_____Touch the ball then the truck then the ball again

_____Put the key in the truck and give me the ball

_____Touch the truck then give me the key and the ball

**TOTAL SCORE FOR SIMPLE COMMANDS:__________________**
*(0 – 24 points)*

## MODIFIED FULD OBJECT MEMORY EVALUATION

**(Revised from G. Seltzer, 12/97)**

**Materials:** Black or Other Dark Colored Cloth Bag With Draw String
Ten Objects: Ball, Bottle, Button, Card (8 of Hearts),Cup, Key, Matches, Nail, Ring, Scissors
30-second sand timer (or other timer that concretely indicates how much time is left)
Check-Off Sheet/Scoring Sheet

**Administration:**

**1. Naming Task**

Each object is pulled from the bag and shown to the respondent. Say, " Next we are going to work with this bag. I am going to pull some things out of it. Please tell me the name of each thing as I pull it out." At the top of the record sheet (Naming 1), give respondent a check mark when they identify the item correctly. When the respondent does not identify the item correctly but uses a verbal approximation, write the approximation in the blank. When there is no response to the item, leave it blank. Judgments about how close a response is to the actual name of the object will undoubtedly be necessary. When E thinks that articulation problems are negatively influencing the person's responses, write the approximation in the blank space. If, during the memory trials the respondent continues to use the same approximation, score it as correct.

After all objects are pulled from the bag, pick up and name any objects that the respondent either failed to name correctly or with some recognizable approximation. Have the respondent repeat the name.

**2. Repeated Recall Task**

Naming: Give the respondent the bag and ask him/her to do the same thing you just did, providing the additional instruction to remember. Say, "Pull the objects out of the bag, one at a time and tell me what they are called. Pay attention to the objects because we are going to put them back in the bag, and you will have to remember what they are." As previously, record responses on the record sheet (Naming 2).

Once again, pick up and name any objects that the respondent either failed to name correctly or with some recognizable approximation. Have the respondent repeat the name. Put all objects back in the bag.

Interference Task: After the objects are back in the bag, say “Now I want you to say as many names for boys/girls (same gender) as you can until the time runs out on this sand timer, you know like, Kate or Susan.” Use the sand timer to give them a concrete indication that they need to continue to say names until all of the sand is gone. Praise them for their effort by saying something like, “I really like the way you are saying those names.” If they stop saying names and indicate that they cannot remember any more, ask them to say as many names from the opposite gender as they can. The goal is to keep them retrieving items from memory for 30 seconds. If they exhaust their memory of names from the opposite category use the categories listed on the scoring sheet. If they exhaust all categories, start again with same gender names.

Recall: Say, “Remember the things in the bag. I'd like to see how many of them you can remember. I am going to make a mark in a box every time you say a thing from the bag. If you say something twice I will make two marks in the same box because each thing just counts once.” On the actual Scoring Sheet, under Trial 1 record the number of correct responses using an “X” or check mark. Write in any

recognizable approximations. On the Check-Off sheet, check a box every time they say a correct item to give them encouragement and to help them remember how many objects they are trying to recall. If they say an item not in the bag, do not give a check and say, "not in the bag." If they repeat an item, make another check mark in a box already checked and say, "already named."

Reminding: Upon completion of each trial, show the objects that were not remembered, name them for the respondent and place them back in the bag. Say, "I am going to name the objects you left out, and after a minute, I will give you a chance to remember all of them again."

Subsequent Trials (2-5): Begin each subsequent trial by returning all objects to the bag. Then do the interference task, followed by recall, and reminding. Say something like, "You worked really hard on remembering those. Now we are going to try again. First, I want you to say as many____ (Category name)s as you can before the time runs out."

End of Trials: The task ends after Trial 5 unless the respondent named 10 correct objects on Trial 1. If 10 objects are recalled on Trial 1, give Trial 2 and stop if they correctly recall 10 items again. Unless they recall 10 objects on both Trials 1 and 2, give all five trials, praising effort. Immediately after the last trial ends, put all objects in the bag and set a timer for 10 minutes. Administer a nonverbal, task during the 10 minutes (e.g., Purdue Pegs, Developmental Test of Visual Motor Integration).

### 3. Delayed Recall

After at least 10 minutes (after completion of nonverbal task), pick up the bag and say, "Do you remember this bag. I want you to tell me the things in it one more time." Record responses on answer sheet and use check-off sheet as before.

**Scoring:**
The scoring schema indicated on the Scoring Sheet is taken from the Fuld Manual (G. Seltzer, November, 1997). Refer to the hypothetical example presented in the "Scoring Sample" table below to understand how "Retrieval" and "Repeated Retrieval" scores were obtained:

**Retrieval:** Count the objects on Trial 1. Enter them for "retrieval". Count objects on Trial 2, enter and so on. Do not accumulate over Trials. Retrieval from long term storage is simply recall on that trial because the naming exercise prevents recall from immediate memory.

**Repeated retrieval:** Underline with a different colored pencil/pen the boxes in which retrieval has occurred on two successive trials. Count the number of times these pairs occur between each of the successive trials. Record. Do not accumulate from trial to trial.

**Scoring Sample:**

| ITEM | Trial 1 | Trial 2 | Trial 3 | Trial 4 | Trial 5 | DELAY |
|---|---|---|---|---|---|---|
| Ball | X | X | X | X | X | X |
| Bottle | | | X | X | X | X |
| Button | | X | X | X | X | X |

| Card | X | | | X | X | |
|---|---|---|---|---|---|---|
| Cup | | | | | | |
| Key | | X | X | X | X | X |
| Matches | | | | | | |
| Nail | | | | X | | X |
| Ring | X | X | X | X | X | |
| Scissors | | | | | X | X |
| RETRIEVAL | 3 | 4 | 5 | 7 | 7 | 6 |
| REPEATED RETRIEVAL | | 2 | 4 | 5 | 6 | **N/A** |

**FULD CHECK-OFF** (sample)

Name: ______________________
Examiner's Name: ________________
Date:________________

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**Fuld Scoring Sheet**

Name: ______________Date: ____________________
______Examiner:______________________ ______________________

**Naming 1**: ___________Ball __________ Bottle___________Button_________Card__
________Cup
___________Key __________ Matches_________Nail___________Ring _
________Scissors

**Naming 2**: ___________Ball __________ Bottle___________Button_________Card__
________Cup
_________ Key __________ Matches_________Nail___________Ring _
_____Scissors

**Recall**:

| ITEM | Trial 1 | Trial 2 | Trial 3 | Trial 4 | Trial 5 | Delay |
|---|---|---|---|---|---|---|
| **Ball** | | | | | | |
| **Bottle/Jar** | | | | | | |
| **Button** | | | | | | |
| **Card/8 of Hearts** | | | | | | |
| **Cup/Mug** | | | | | | |
| **Key** | | | | | | |
| **Matches** | | | | | | |
| **Nail** | | | | | | |
| **Ring** | | | | | | |
| **Scissors/Shears** | | | | | | |
| **RETRIEVAL** | | | | | | |
| **REPEATED RETRIEVAL** | | | | | | **N/A** |

**Interference Task Categories:** Same gender names - like Nancy, Susan
Opposite gender names - like Mike, John
Colors - like green, red
Furniture - like bed, chair
Plants - like tree, flower
Places to eat - like McDonalds, Burger King