

Evaluation of Cognitive Status and Dementia in OCTO Twin

Boo Johansson

The memory and cognitive battery encompassed the following questions and tests:

1. *Orientation to own person (Full Name, Year of birth, Current age)*
2. *Self-ratings of memory and thinking (6 questions)*
3. *The Mini-Mental State Examination (MMSE; Folstein, et.al., 1975).*
4. *The Information Test (A Swedish version of the WAIS Information Task (Jonsson & Molander, 1964)*
5. *Figure Logic/Inductive Reasoning (SRB:2 from Dureman & Sälde, 1959)*
6. *Block Design - Koh's Block Test (SRB 3 from Dureman & Sälde, 1959)*
7. *Verbal Meaning – Synonyms (SRB 1 from Dureman & Sälde, 1959)*
8. *Digit – Symbol (A modified version of the speeded Symbol-Digit Substitution Test from the Wechsler Adult Intelligence Scale, WAIS (Wechsler, 1991) where subjects were instructed to give a verbal response, instead of a written).*
9. *Digit – Span Forward and Backward (WAIS; Wechsler, 1991)*
10. *Perceptual Speed – Psif (from Dureman & Sälde, 1959)*
11. *Thurstone's Picture Memory Test (Thurstone & Thurstone, 1949)*
12. *Prose Recall (A Swedish language prose recall task similar to the prose passages in the Wechsler Memory Test (WMS; Wechsler, 1945)*
13. *The MIR Test, including naming, free recall, recognition and correspondence tasks (Johansson, 1988/89)*
14. *The Swedish Clock Test (including the three subtests of: clock drawing, set the hands of a wooden clock with no numbers on the face to certain standard times, and set time to certain standard times (see, Johansson & Zarit, 1991)*
15. *The Coin Test (see, Johansson & Zarit, 1991)*

For more detailed information on the diagnostic procedures and the tests, including validity and reliability see Johansson and Zari, 1991; 1995, 1997, Johansson, et.al., 1992, McClearn, et.al., 1997, and Johansson et.al, 1999.

Each test protocol was thoroughly reviewed and evaluated in the context of the persons overall health and physical functioning, including sensory functioning, motor handicaps, etc. Observations of test-taking behavior and everyday functioning during the in-person testing sessions were presented to Boo Johansson (BJ) who rated each individual on a 5-point scale. This rating of cognitive status (Cognitive Rating, CR) represents a composite score. The CR is used as a convenient way to summarize performance across the tests and to provide an overall evaluation of the persons overall memory and cognitive function.

1. Intact - “normal” - memory and cognitive functioning

taking sensory and motor function, overall health, and physical functioning into account

2. Mild dysfunction/Questionable impairment:

Evidence of mild impairment in memory and cognitive test performance. However, compromised memory and/or cognitive functioning not meeting criteria for dementia; DSM-III-R criteria (American Psychiatric Association, 1987).

3. Mild impairment/dementia

Meeting criteria for mild dementia DSM-III-R criteria (American Psychiatric Association, 1987).

4. Moderate impairment/dementia

Meeting criteria for moderate dementia DSM-III-R criteria (American Psychiatric Association, 1987).

5. Severe impairment/dementia

Meeting criteria for severe dementia DSM-III-R criteria (American Psychiatric Association, 1987).

Individuals rated as 3-5 (tentatively diagnosed as suspected or demented) were routinely given a diagnostic work-up, including a detailed interview with a key informant about memory and cognitive problems (onset, course and symptomatology), and a review of medical records. Findings were presented and discussed at a consensus diagnosis conference. Diagnoses were assigned following DSM-III-R criteria for dementia [18], NINCDS/ADRDA criteria for Alzheimer's disease [19] and the NINDS-AIREN criteria for vascular dementia [20].

Additional information from medical records

Besides the in-person based evaluation medical records were reviewed in order to identify whether an individual might have received a dementia diagnosis. This routine was employed to ensure that individuals who declined participation at follow-ups were followed with respect to incidence of dementia.

OCTO Twin CODING:

The demtype variable is only based on in-person tested cases, found to be suspects of dementia and therefore taken through the consensus conference routine.

The totaldem variable is the sum of in-person evaluation and medical records (and information from the Harmony study). .

Appendix – *Protocols used in Consensus Conference*

Criteria for dementia (DSM-III-R)

	CRITERION		
	Present/ Yes	Absent/ No	Uncertain
A. Demonstrable evidence of impairment in short- and long-term memory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. At least one of the following:			
1. Impairment in abstract thinking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Impaired judgment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Other disturbances of higher cortical function	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Personality change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. The disturbance in A and B significantly interferes with work or usual social activities or relationships with others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Not occurring exclusively during the course of Delirium	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Either 1 or 2:			
1. There is evidence from the history, physical examination, or laboratory tests of a specific organic factor (or factors) judged to be etiologically related to the disturbance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Criteria for clinical diagnosis of Alzheimer's Disease (NINCDS/ADRDA)

	CRITERION		
	Present/ Yes	Absent/ No	Uncertain
PROBABLE ALZHEIMER'S			
I. Criteria			
1. Dementia established by clinical examination	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Deficits in two or more areas of cognition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Progressive worsening of memory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. No disturbance of consciousness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Absence of systemic diseases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
II. Supported by			
1. Progressive deterioration of specific cognitive functions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Impaired activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Present/ Yes	Absent/ No	Uncertain
III. Consistent with			
1. Plateaus in the course of progression of the illness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Associated symptoms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Other neurological abnormalities in some patients	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Seizures in advanced disease	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. CT normal for age	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

IV. Unlikely features			
1. Sudden, apoplectic onset	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Focal neurologic findings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Seizures or gait disturbances	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

POSSIBLE ALZHEIMER'S

V. Criteria			
1. Dementia syndrome	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Presence of a second disorder is permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. A single progressive deficit is sufficient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Alzheimer's disease (according to NINCDS-ADRDA criteria)

Check One

1. Probable AD
2. Possible AD

**Criteria for the diagnosis of vascular dementia
(NINDS-AIREN)**

CRITERION
Present/ Absent/ Uncertain
Yes No

PROBABLE VASCULAR

I Criteria			
1. Dementia			
(a) Impairment of memory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) Impairment of two or more cognitive domains	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c) Interfere with daily activities not due to physical effects of stroke alone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Cerebrovascular disease			
(a) Focal signs on neurologic examination	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) Evidence of relevant CVD by brain imaging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Present/ Yes	Absent/ No	Uncertai
3. A relationship between the above two disorders			
(a) Onset within 3 months of stroke	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) Abrupt deterioration or fluctuating, stepwise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
II Consistent with			
1. Early presence of a gait disturbance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. History of unprovoked falls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Urinary symptoms not explained by urologic disease	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Pseudobulbar palsy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Personality and mood changes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
III Unlikely features			
1. Absence of corresponding focal lesions on brain imaging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Absence of focal neurologic signs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Absence of cerebrovascular lesions on CT/MRI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
POSSIBLE VASCULAR			
VI. Permitted			
1. Absence of brain imaging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Absence of clear temporal relationship between dementia and stroke	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Subtle onset and variable course and evidence of relevant CVD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Vascular disease (according to NINCDS-AIREN criteria)

Check One

1. Probable VaD
2. Possible VaD

Evaluation - Diagnosis

Datum: c20
 År mån dag

Prel. demens enl. DSM-III-R-kriterier: kvarstår; ej work-up () 0
 bekräftas () 1 avfärdas () 2 avvaktas () 3
 pgac21

Ej demens/ ev. annan diagnos () **9** (c22 type:main)

Demens ? (290 Y) () **0**

Demens NUD () **1**

Primärdegenerativ demens () **2** (c23 type 2)

*** Alzheimer-typ**

- Alzheimer's; trolig (NINCDS/ADRDA) () 21

- Alzheimer's; möjlig (.....".....) () 22

*** Annan** - () 25 -

Vaskulär demens () **3** (c24 type 3)

- Vaskulär demens, trolig (NINDS-AIREN) () 31

- Vaskulär demens, möjlig (.....".....) () 32

- Multifarkt demens (DSM-III-R) () 33

- Om 31/32 och 33 () 35

Mixed demens, spec..... () **4**

Sekundär demens () **8** (c25 type 8)

- Hjärnskadebetingad demens(bild) kod 310 () 81

- Normaltryckshydrocefalus () 82

- Infektionsrelaterad, spec..... () 83

- Övrigt, spec..... () 84 -

Andra störningar/sjukdomar och tillstånd av betydelse för demens Nej () 0 Ja () 1 c30

*** Depression (Major enl. DSM-III-R)** () c31

*** Annan psykisk störning** () c32

*** Signifikanta somatiska sjukdomar/tillstånd** () c33

Signifikanta livshändelser och liknande av betydelse för demens Nej () 0 Ja () 1 c34

*** *Grad av säkerhet i diagnos* : låg ()₁----- ()₂----- ()₃ *hög* *** c40

References

- American Psychiatric Association (1987): Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R). 3rd Edn., APA, Washington, DC.
- Folstein MF, Folstein SE, McHugh PR. "Mini-Mental State": A practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res* 1975;12:189-198.
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- Román GC, Tatemichi TK, Erkinjuntti T, et al. Vascular dementia: Diagnostic criteria for research studies. Report of the NINDS-AIREN International Workshop. *Neurology* 1993;43:250-260.