# What Semantic Clues Distinguish Early Alzheimer's Disease from Depression in Aging?

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## 1 ALZHEIMER DISEASE (AD) vs DEPRESSION (DP)

### A DIAGNOSTIC CHALLENGE

- Both disorders, AD and DP, affect **semantic memory (SM),** but in different ways:
  - AD: central and progressive impairment of SM
  - DP: access disorder of SM

- Semantic assessments are emerging as crucial tools for differential diagnosis

### Study Objective:

To determine which semantic memory evaluation best distinguishes AD from depression.

## 2 POPULATION (N=101)
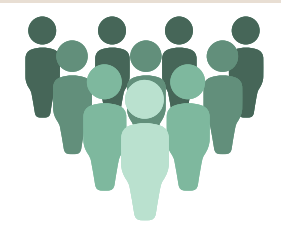
|  | AD group (N=40) | DP group (N=20) | Control group (N=41) | Comparison (ANOVA) |
|---|---|---|---|---|
| Age | 73.43+/-4.3 | 68.05+/-6.8 | 67.63+/-4.5 | p<.001 |
| Education | 12.1+/-2.4 | 11.1+/-3.1 | 12.2+/-2.6 | p>.05 |
| MMSE | 24.3+/-3 | 26,7+/-2/1 | 28.5+/-1.2 | p<.001 |
| Gender | 31 / 9 | 15 / 5 | 27 / 14 | p>.05 (X-2) |

## 3 MATERIAL

### Psycho-affective questionnaires

| | |
|---|---|
| **STAI-Y form A** | Measures state anxiety — how a person feels "right now" (Spielberger,1970) |
| **STAI-Y FORM B** | Measures trait anxiety : how a person generally feels across time and situations (Spielberger,1970) |
| **GDS** | Measures depressive symptoms in older adults Yesavage (1982) |

### Semantic assessment

| | |
|---|---|
| **Semantic fluency** | As many animal words as possible in 2 minutes (Cardebat et al.,1990) |
| **Phonological fluency** | As many words beginning by the letter "L" as possible in 2 minutes (Cardebat et al.,1990) |
| **Mini-SKQ** | Answering 12 semantic questions (Simoes Loureiro et al., 2018) — Is an ostrich a four-legged animal, a bird or an insect? |
| **Camel and Cactus Test (CCT)** | Semantic matching task (Adlam et al., 2010) |
| **Vocabulary** | Knowledge of words — Wechsler Adult Intelligence Scale (WAIS) (Wechsler, 2008) |
| **Similarity** | Conceptual link identification between words — Wechsler Adult Intelligence Scale (WAIS) (Wechsler, 2008) |

## 4 RESULTS

Age is considered as a covariable

### Psycho-affective measures

|  | AD group (N=40) | DP group (N=20) | Control (N=41) | Comparison (ANCOVA) |
|---|---|---|---|---|
| STAI-T | 41.9+/-5.4 | 45.6+/-5.9 | 45.6+/-5.9 | p>.05 |
| STAI-S | 44.57+/-12.8 | 35.3+/-13.52 | 40.56+/-13,65 | p>.05 |
| GDS | 12.3+/-3.2 | 15.6+/-3.7 | 10.2+/-2.5 | p=.003 |

### Semantic assessment

|  | AD group | DP group | Control | ANCOVA |
|---|---|---|---|---|
| Semantic Fluency | 14.7+/-7.1 ≠ | 24+/-7 ≠ | 30.5+/-9.8 | p<.001 |
| Phonologic fluency | 15+/-6.3 | 17+9/-4 ≠ | 24.8+/-8.3 | p<.001 |
| CCT | 52+/-5 | 53.7+/-5.7 | 55.3+/-4 | p>.05 |
| Mini-SKQ | 11+/-1 | 10.8+/-1.1 | 11.6+/-0.9 | p>.05 |
| Vocabulary | 24.5+/-9.1 | 29.7+/-10.4 | 32.6+/-10.7 | p=.015 |
| Sim | 17.6+/-5.9 | 20.2+/-9/4 | 23.8+/-5.9 | p=.002 |

≠ p<.05 AD -DP    ≠ p<.05 DP -Control    ≠ p<.05 AD -Control

## 6 CONCLUSIONS

These results illustrate the difficulty of distinguishing DP in aging from AD. Screening test (mini-SQK) or semantic tests that does not involve executive control (CCT) do not appear to be useful for differentiating both conditions. However, a detailed analysis of lexical-semantic profiles provides an opportunity to differentiate these two conditions. **Semantic fluency** is particularly impaired in **AD**, reflecting a **central semantic deficit**, whereas it is less affected in DP. This is the only test that reliably differentiates AD and DP. Future research should focus on larger populations to validate these findings. Also, incorporating neuroimaging techniques could provide deeper insights into the neural correlates of semantic impairments in AD and depression. Moreover, developing more sensitive and specific semantic assessments that involve executive control could enhance diagnostic accuracy.