

Highlighting the lexico-semantic deterioration in Alzheimer's disease with a semantic knowledge questionnaire



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Objectives

In patients with Alzheimer's disease (AD), lexico-semantic difficulties occur early and increase in the course of the illness. The bottom-up process theory is today well accepted: **subordinate attributes tend to decline more rapidly than superordinate ones**. Nevertheless, a specific issue in semantic memory investigation in AD is to determine the severity of the semantic impairment. Given that some authors doubt about the systematic apparition of semantic disorder in early AD (Chainay, 2005), we argue that the constitution of experimental AD groups must consider the semantic deterioration stage and not only the general cognitive decline, as suggested by Hernandez et al. (2008).

We thus propose a specific semantic knowledge questionnaire (SKQ), based on Laiacona et al.'s work (1993), to determine the severity of the semantic knowledge deterioration.

Population

SKQ was proposed to 49 AD patients (44 females) and 33 healthy old people (18 females). **Three experimental AD groups were created**, based on the global cognitive deterioration as proposed by the GRECO (Hugonot-Diener et al., 2008).

- 1) Subjects with a MMSE score superior to 20 (N = 16 ; AD1);
- 2) Subjects with a MMSE comprised between 16 and 19 (N = 12 ; AD2);
- 3) Subjects with a MMSE strictly inferior to 16 (N = 21 ; AD3).

In a second analysis, we splitted our AD1 group in two subgroups based on SKQ score: AD1 with **very mild semantic alteration (ADSD1)** or with **mild semantic deterioration (ADSD2)**.

All Groups were matched in terms of age and socio-cultural level.

Material

SKQ consists of a multiple choice questionnaire with 30 items (15 living and 15 non-living items) associated with 4 questions (Q1. superordinate question, Q2. intracategorical question, Q3. perceptive question and Q4. functional/thematic question).

Is the sailing boat an animal, an object or a plant?



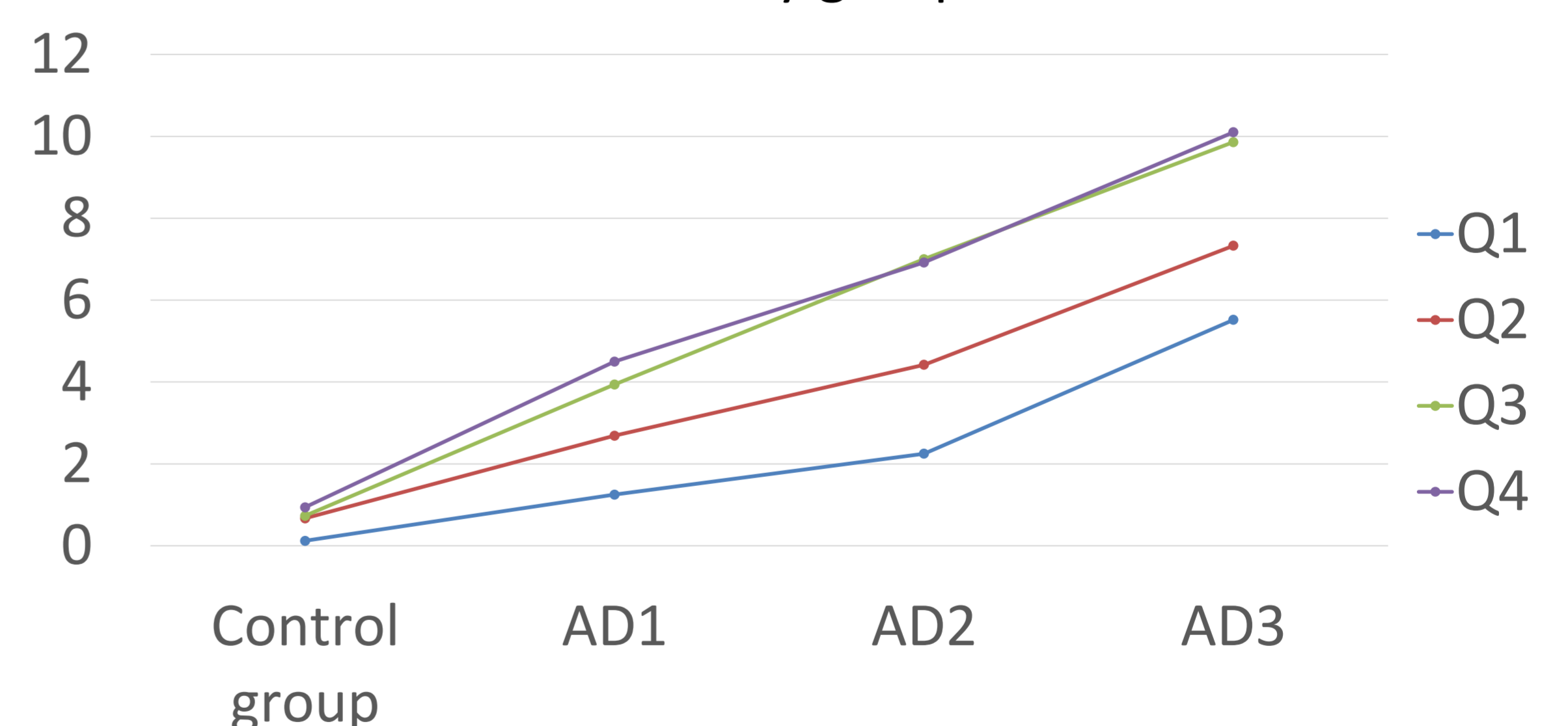
Results

Anova on repeated measures show a **significant group effect** ($F=32.313$; $\alpha=.001$), a **significant question effect** ($F=72.447$; $\alpha=.001$) and a **significant interaction effect** ($F=8.488$; $\alpha=.001$) (Figure 1),

Moreover, a **significant correlation between the total errors at the SKQ and the MMSE score** ($r=-.737$; $\alpha=.001$) is observed.

Finally, we show that **ADSD1 and ADS2 differ significantly on SKQ semantic scores** ($U=.000$; $p=.001$) on Q3 scores ($U=5.000$; $\alpha=.009$) and on Q4 scores ($U=6.500$; $\alpha=.013$) while they don't differ in global cognitive scores as measured by the MMSE ($U=19.00$; $p=.377$), in Q1 score ($U=16.500$; $p=.221$) and in Q2 score ($U=19.500$; $p=.377$).

Figure 1 : Number of errors by type of question and by group



Discussion

Our results suggest that our SKQ is adapted to highlight the semantic deterioration and the bottom-up process in AD: superordinate information (Q1-Q2) are better preserved than subordinate information (Q3-Q4). We equally demonstrate that AD1 patients can show a different semantic alteration, with mild (ADSD2) or very mild (ADSD1) semantic deterioration without any differences in global cognitive alteration. This result clearly show that research on semantic deterioration in early stage of AD must take into account the severity of the semantic alteration, while inter-individual differences can obviously occur.

References

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