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Impact of depression on semantic processing in Alzheimer's disease : Results from an affective priming



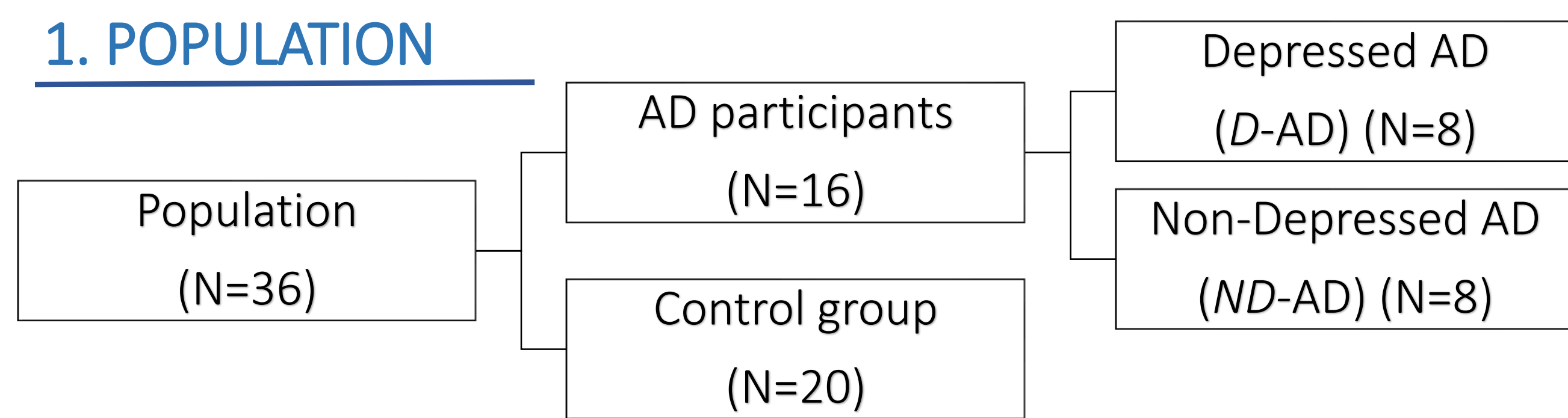
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Introduction

In **Alzheimer's disease (AD)**, memory breakdown is an early symptom characterized by episodic disorders, but also by **semantic memory (SM)** impairment. This SM alteration appears through modifications in the lexico-semantic network and can be observed with a semantic priming paradigm. Moreover, **mood disorders** may also be noted in AD. It is well known that **depression** can have a significant impact on memory performances. Nevertheless, there are few studies that clarify the deleterious impact of depression on SM in AD. Therefore, the aim of this study is to analyse this impact on priming effect in AD with an affective priming protocol.

Methodology

1. POPULATION



| | Age | MMSE | GDS | QAG | PPTT |
|----------------|------------|-------------|-------------|-------------|-------------|
| Control (N=20) | 81.8 (6.8) | 28.4 (1.2) | 4,1 (1,6) | 34,7 (1,2) | 94,8 (3,2) |
| ND-AD (N=8) | 85.8 (4.4) | 24.1* (0,9) | 5,6* (4) | 33,6 (4,3) | 85,6* (4,1) |
| D-AD (N=8) | 82.7 (7.5) | 24* (1,6) | 16,1* (2,4) | 41,1* (6,6) | 89,2* (4,3) |

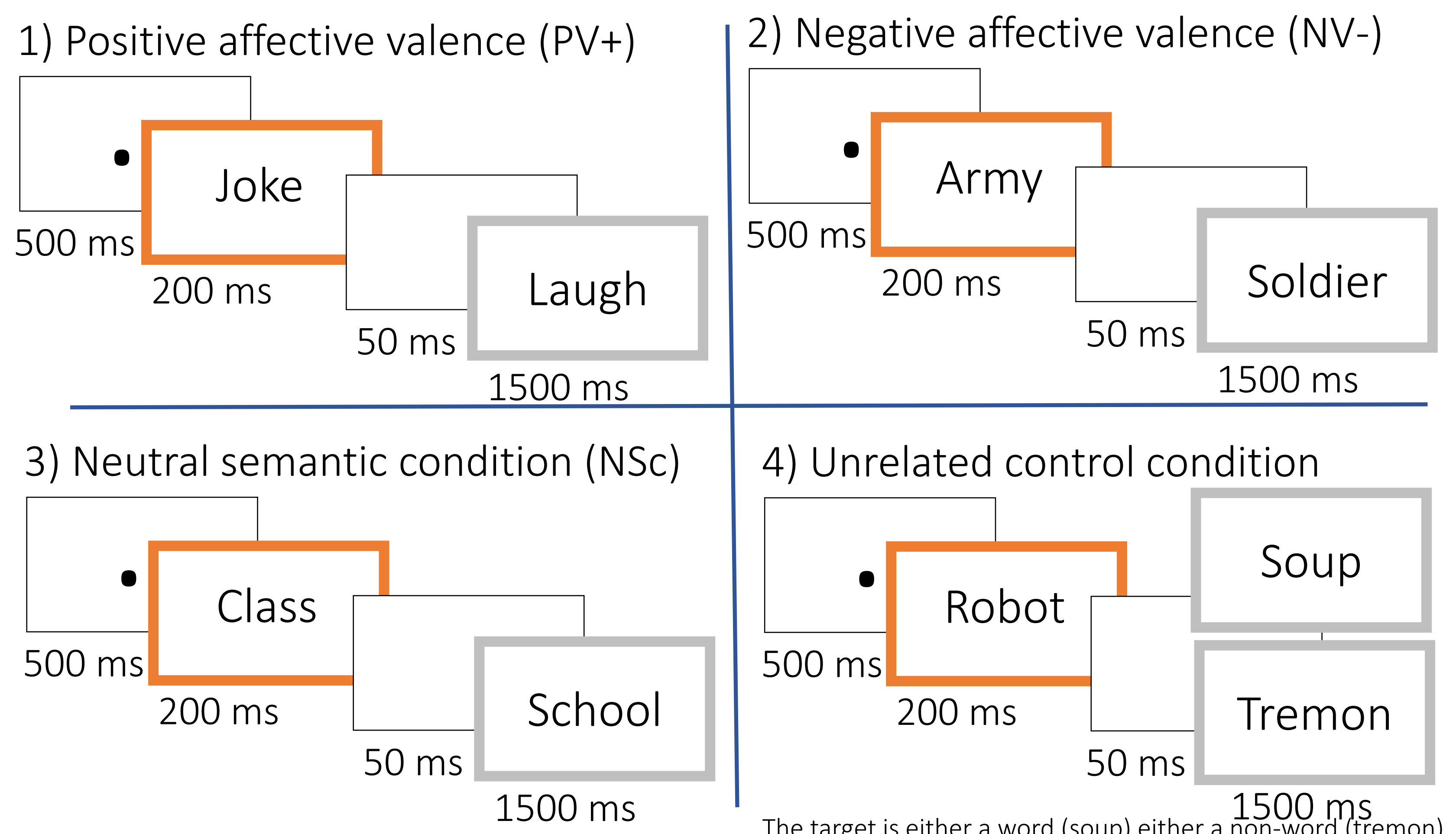
Mean and standard deviation : MMSE = *Mini-Mental State Examination* ; GDS= *Geriatric Depression Scale* ; QAG = *Questionnaire of general anxiety* ; PPTT = *Pyramid and Palm Trees Test*

* Significant difference with $p < .05$ (comparison with the control group at the Student t test)

2. TASK

Semantic and emotional priming paradigm (lexical decision)

4 experimental conditions (3 related and 1 unrelated control)



Results

1. INTRAGROUP COMPARISONS

Measure of priming effect (PE)

Student t test comparing related conditions (R) and unrelated condition (UR)

| | Control group | ND-AD | D-AD |
|------------|--|--|--|
| PE for NV- | 122.9 (117) * $t = -4.696 ; p = .001$ | 254.5 (267.27) * $t = -2.688 ; p = .031$ | 668.12 (544.78) * $t = -3.469 ; p = .010$ |
| PE for PV+ | 183.22 (209.44) * $t = -3.912 ; p = .001$ | 391.98 (331.78) * $t = -3.342 ; p = .012$ | 543.68 (456.65) * $t = -3.367 ; p = .012$ |
| PE for NSc | 118.98 (164.28) * $t = -3.239 ; p = .004$ | 236.92 (263.47) * $t = -2.543 ; p = .038$ | 380.7 (424.73) * $t = -2.535 ; p = .039$ |

Priming effect (PE) : reaction time (UR-R) by group and by condition

* Significant difference with $p < .05$

2. INTERGROUP COMPARISONS

Comparison of PE

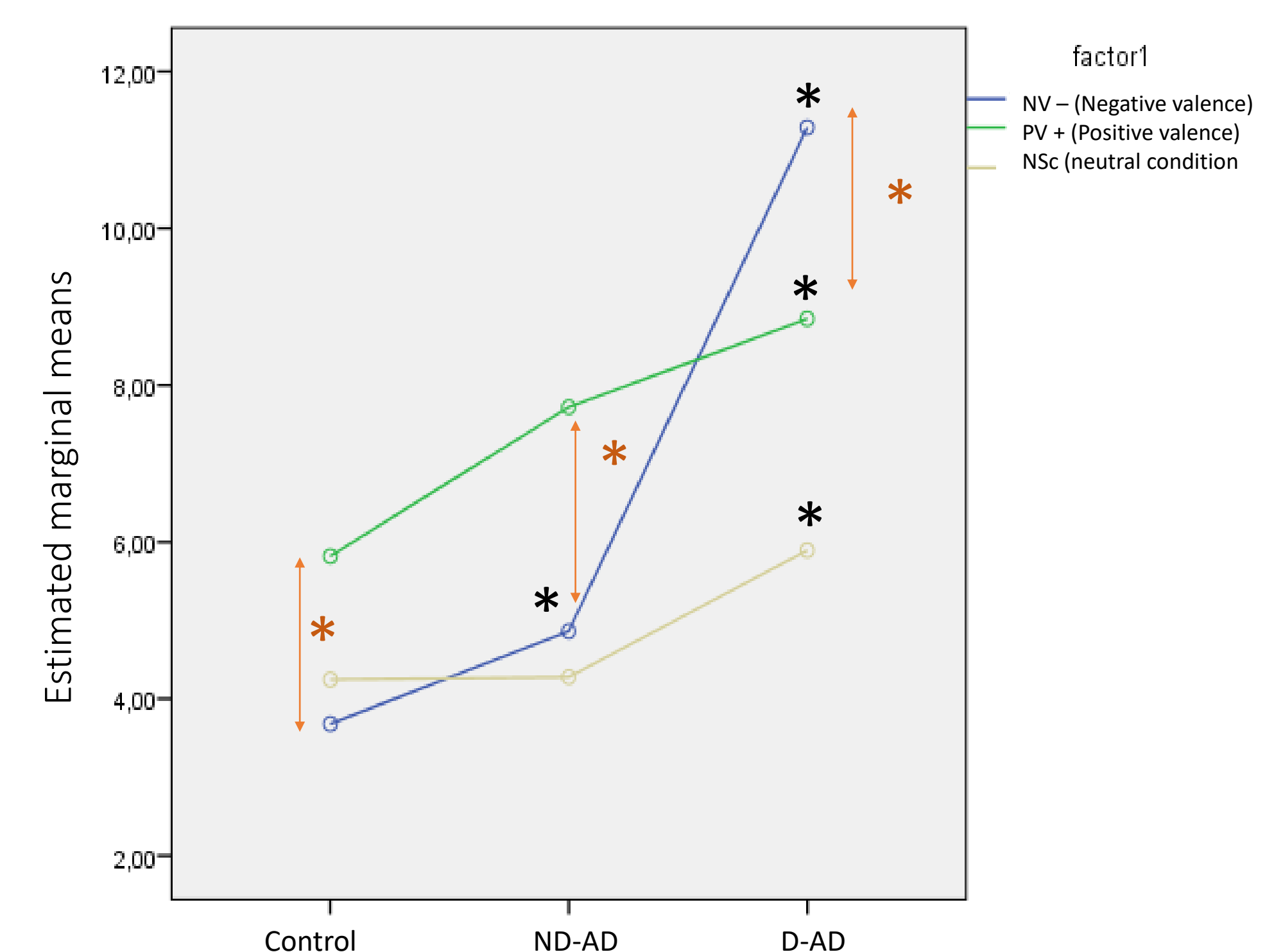
Repeated-measures ANOVA

Group (G) effect
 $(F = 41.526 ; p = .001)$

Condition (C) effect
 $(F = 5.453 ; p = .008)$

Interaction effect G*C
 $(F = 3.082 ; p = .025)$

Transformed PE by group and by conditions



* Significant difference with $p < .05$ (comparison with the control group)

* Significant difference with $p < .05$ (comparisons between conditions)

Discussion and conclusions

These results demonstrate, as expected, priming effects for semantic and emotional conditions in all our groups. However, we showed a specific hyperpriming effect for the negative valence condition in the AD group with depression comparatively to positive valence and neutral condition. On the contrary, control participants and non-depressed AD present more important priming effect for the positive condition compared to neutral and negative ones. We propose that a **negative mood** has an impact on the processing of negative information, shown by a specific hyperpriming effect in AD patients with depression, in line with an easier processing. This facilitation effect can be viewed as a **difficulty to inhibit negative thoughts**, probably linked to a **disorganized semantic network**, as demonstrated by the hyperpriming effect in subjects with depression