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Impact of iconic gestures on speech comprehension and link to inhibition difficulties in mild and moderate Alzheimer's patients

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1. Introduction

- Language and executive impairments are central in Alzheimer's disease (AD) (Joanette et al., 2013)
- Inhibitory functioning has been particularly investigated ; verbal inhibition seems more impaired than motor inhibition (Amieva et al., 2002)
- Non verbal communication, such as gestures, can be used as a support system to comprehension difficulties (Schiaratura et al., 2015)
- Iconic gestures, type of co-verbal gestures, represent concrete items (Holle, 2007)
- Congruent bimodal presentation enhances while mismatch (incongruent) presentation decreases comprehension in AD (Holle, 2007)

2. Aims

1. Iconic hand gestures $\xrightarrow{\text{Impact ?}}$ Language comprehension in AD
2. Highlight an advantage of bimodal congruent presentation on unimodal and mismatch presentation
3. Presence of a deficit in verbal and relative preservation of motor inhibition
4. Influence of attention and education level on performances

4. Methodology

- Experimental task: 90 boards of 18 items each in 5 conditions
 - Speech alone
 - Gesture alone
 - Congruent Speech + Gesture (Cong)
 - Incongruent gesture inhibition (IGI)
 - Incongruent speech inhibition (IVI)
- Simon task
- Stroop Victoria (french version)
- Boston Naming test
- Test des 3 matrices
- Recording : Number of correct responses



6. Discussion

1. Poorer performances from AD compared to healthy subjects
2. Enhancement of comprehension in congruent bimodal presentation --> Benefic effect of bimodal presentation
3. Presence of interference effect --> Attempt of speech and gesture integration
4. Higher performances on speech condition of experimental task compared to BNT suggests effect of visual complexity on performances
5. IGI appears easier to AD patients than IVI suggesting lower performances on verbal inhibition than motor inhibition
6. Presence of an effect of education level on performances for all conditions except congruent bimodal presentation

7. Prospective

- Replicate study with larger population sample controlled for age and education level
- Pursue experimental task validation by controlling psycholinguistic variables potentially affecting performance (AoA, name/image agreement)

3. Population

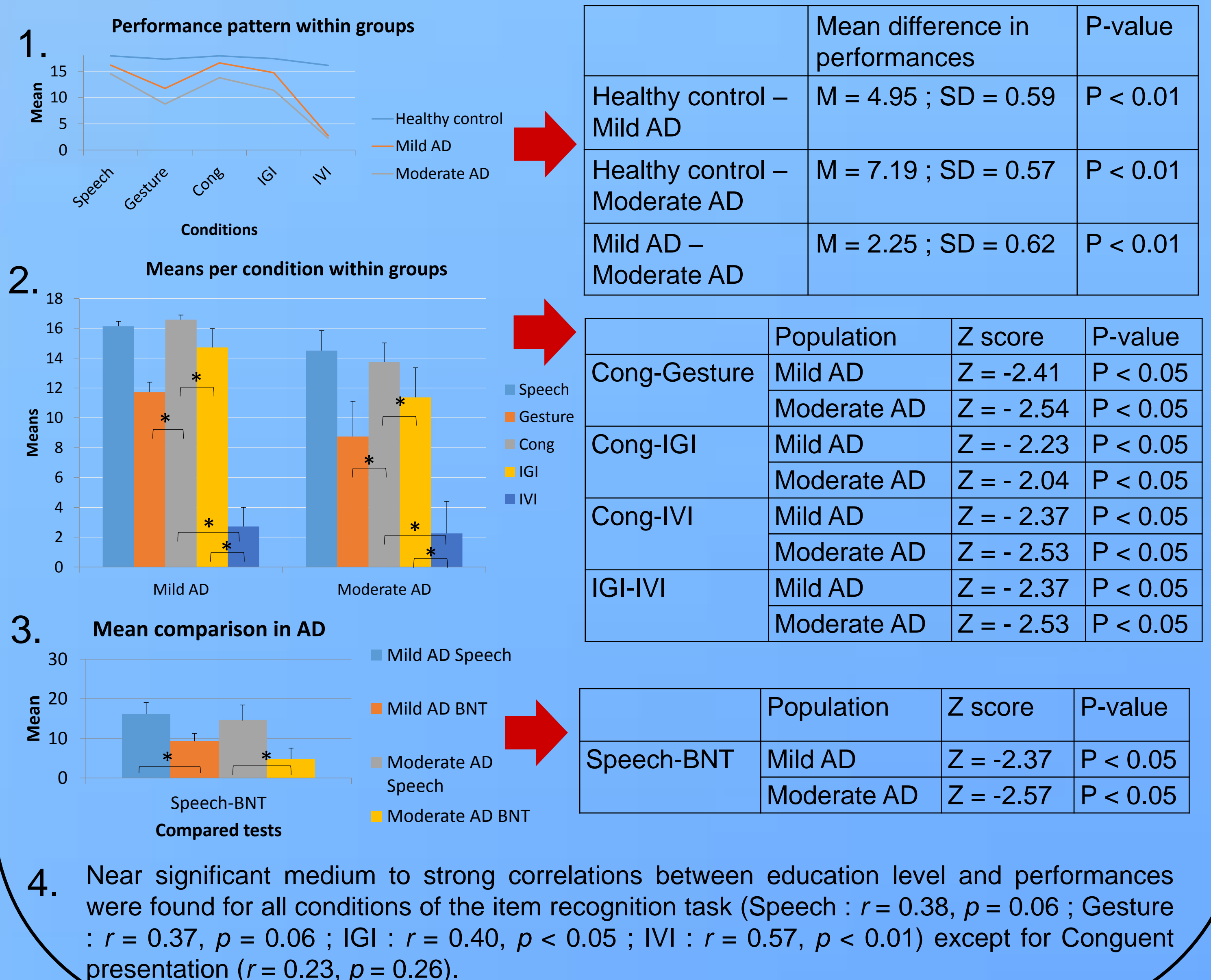
- 29 subjects from 61 to 90 years old
 - 10 healthy subjects, 11 mild AD and 8 moderate AD

	Healthy – Mild AD		Healthy – Moderate AD		Mild AD – Moderate AD	
Mean Age	73.1 ± 6.31	84.09 ± 3.36	73.1 ± 6.31	83.37 ± 9.57	84.09 ± 3.36	83.37 ± 9.57
P-value	t(19) = -5.05; p < 0.01		t(11,634) = -2.61; p < 0.05		t(8,263) = 0.20; p = 0.84	
Mean MMSE (/30)	28.9 ± 0.74	18.18 ± 1.66	28.9 ± 0.74	12.5 ± 0.25	18.18 ± 1.66	12.5 ± 0.25
P-value	t(19) = 18.75; p < 0.01		t(16) = 27.42; p < 0.01		t(15,205) = 7.67; p < 0.01	
Mean GDS (/15)	2.3 ± 1.34	3.12 ± 1.46	2.3 ± 1.34	3.09 ± 1.22	3.12 ± 1.46	3.09 ± 1.22
P-value	t(18,333) = -1.41; p = 0.17		t(14,491) = -1.23; p = 0.24		t(13,505) = -0.05; p = 0.96	
Mean E.L (/4)	3.6 ± 0.84	2.36 ± 0.81	3.6 ± 0.84	3 ± 0.53	2.36 ± 0.81	3 ± 0.53
P-value	t(18,626) = 3.42; p < 0.01		t(15,337) = 1.84; p = 0.09		t(16,906) = -2.06; p = 0.06	

MMSE = Mini Mental State Examination ; GDS = Geriatric Depression Scale ; E.L = Education Level

5. Results

Only significant results are presented ; non significant results were found for analyses performed on results at the 3 matrices tests and Stroop Victoria



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