



# Differential Impairment of Cognitive and Affective Theory of Mind in Early Alzheimer's Disease

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**Key Take Away** - Selective impairment in Cognitive Theory of Mind may emerge early in Alzheimer's disease, highlighting the importance of assessing social cognitive functions beyond global cognitive measures.

## INTRODUCTION

Theory of Mind (ToM) denotes the ability to mentalize and interpret beliefs, intentions, thoughts and emotional states of oneself and others. ToM can be fractioned into two key components: Cognitive - involving processing of other peoples beliefs and intentions and Affective - involving processing of other peoples emotions and feelings. Although ToM impairment has been reported in Alzheimer's disease (AD), it remains unclear whether these components are differentially affected in the early stages. We have compared cognitive and affective ToM in individuals with Early AD and examined the association between ToM and global cognition as well as dementia severity.

## METHODOLOGY

22 participants with Early AD (Demographic details in - Table1) completed the adult version of Faux Pas Recognition test which assesses ToM, as well as assessments to determine Global Cognitive functioning [Addenbrooke's Cognitive Examination (ACE-III)] and dementia severity [Clinical Dementia Rating Sum of Boxes (CDR-SOB)]. Cognitive ToM scores was derived from responses to Questions 1–5 in each faux pas story, assessing recognition of the faux pas, speaker identification, and understanding of beliefs and intentions of the speaker.

Table 1

Demographic data of the sample

|                      |              |
|----------------------|--------------|
| Age (Mean;S.D)       | 69.77 ; 5.29 |
| Education (Mean;S.D) | 13.77 ; 3.05 |
| Sex (M/F)            | 10/12        |
| ACE- III (Mean;S.D)  | 80.68; 9.69  |
| CDR – SOB (Mean;S.D) | 2.88;1.31    |

Affective ToM was derived from Question 6, which assessed the participant's inference of the affected person's emotional state. Scores were normalized to a percentage of maximum possible points before analysis to ensure the observed dissociation was not driven by scale differences between components. Results were analyzed using SPSS v21.

## RESULT

Wilcoxon Signed-Rank Test revealed a significant difference between percentage - affective and cognitive ToM scores, with a medium-to-large effect size ( $r = .51$ ). Affective ToM performance was significantly higher than cognitive ToM indicating within domain dissociations in ToM functioning in Early AD [Table 2].

Table 2

Comparison of Cognitive and Affective ToM Scores

|               | Mean (S.D)    | Z     | p    |
|---------------|---------------|-------|------|
| Affective ToM | 54.09 (27.20) | -2.41 | .016 |
| Cognitive ToM | 48.36 (26.07) |       |      |

Correlation analysis showed trends toward a positive association between both ToM components and global cognition, though they are not statistically significant. Neither ToM component was significantly correlated with dementia severity [Table 3]

Table 3

Relationships Between Cognitive Performance Measures and Theory of Mind Scores

|               | CDR SOB        |      | ACE – III Total |      |
|---------------|----------------|------|-----------------|------|
|               | Spearman's rho | p    | Spearman's rho  | p    |
| Affective ToM | -0.15          | 0.49 | 0.41            | 0.05 |
| Cognitive ToM | -0.001         | 0.99 | 0.39            | 0.06 |

## CONCLUSION

Theory of Mind is non uniformly impaired in early Alzheimer's disease. Domain-specific dissociations emerge, indicating differential vulnerability of cognitive versus affective ToM processes. The subtle correlation of the ToM components and overall cognitive functioning highlights the importance of assessing socio-cognitive features alongside classical cognitive domains in early AD.

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