



# Relationship among psychiatric, motor and cognitive functioning in non-demented individuals with Parkinson's disease

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## OBJECTIVE

- ✓ To examine the relative contribution of psychiatric, motor, and cognitive variables in explaining memory ability in non-demented individuals with Parkinson's disease (PD).

## BACKGROUND

- ✓ The neuropsychological evaluation for deep brain stimulation of patients with PD involves the assessment of psychiatric symptoms and cognitive functioning to screen for severe depression, anxiety, and dementia.
- ✓ Depression and anxiety are common psychiatric issues found in a subgroup of individuals with PD, with prevalence rates ranging anywhere between 10 to 60% (Edwards et al., 2002; Kremer & Starkstein, 2000; Merschedorf et al., 2003; Slaughter et al., 2001).
- ✓ Memory impairment is a hallmark of dementia, but can be affected by numerous other factors, including elevated levels of depression and anxiety, impaired attention, and naming difficulties (Broussolle et al., 1999; Kuzis et al., 1997; Norman et al., 2002; Rojo et al., 2003; Starkstein et al., 1990; Tröster et al., 1995; Youngjohn et al., 1992; Wertman et al., 1993).

## PARTICIPANTS

- ✓ Fifty-one non-demented individuals with Parkinson's Disease.
- ✓ Demographic data are presented in Table 1. Results were similar when controlling for the wide age, education, age at onset, and duration of illness ranges.

Table 1. Sample characteristics

	Mean (SD)	Range
Age (years)	63.7 (10.2)	31 to 80
Education (years)	15.4 (3.1)	4 to 21
Age of onset (years)	55.3 (11.8)	28 to 79
Duration of illness (years)	8.4 (6.6)	1 to 24
Mini Mental State Exam	28.7 (1.2)	26 to 30
Dementia Rating Scale	137.7 (5.0)	126 to 144
UPDRS	28.2 (13.0)	6 to 63
Sex	72.9% male	

## TESTS ADMINISTERED

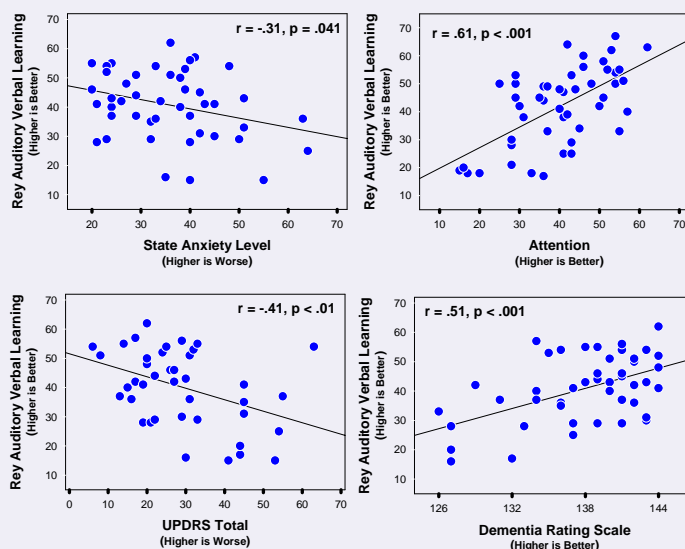
Verbal memory (Rey Auditory Verbal Learning Test), nonverbal memory (Brief Visual-spatial Memory Test), naming (Boston Naming Test), sustained attention and concentration (Symbol Digit Modalities Test-Oral), anxiety/depression (Brief Symptoms Inventory, State/Trait Anxiety Inventory), Mattis Dementia Rating Scale, motor-related impairment (UPDRS total while on medication).

## CORRELATION MATRIX

	1.	2.	3.	4.	5.	6.	7.
1. Verbal Memory	—						
2. Nonverbal Memory	<b>.67</b>	—					
3. Naming	<b>.45</b>	<b>.42</b>	—				
4. Attention	<b>.61</b>	<b>.64</b>	<b>.45</b>	—			
5. Anxiety	<b>-.31</b>	<b>-.38</b>	<b>-.32</b>	<b>-.21</b>	—		
6. Depression	<b>-.29</b>	<b>-.34</b>	<b>-.32</b>	<b>-.25</b>	<b>.71</b>	—	
7. Motor	<b>-.41</b>	<b>-.26</b>	<b>-.32</b>	<b>-.18</b>	<b>.34</b>	<b>.46</b>	—

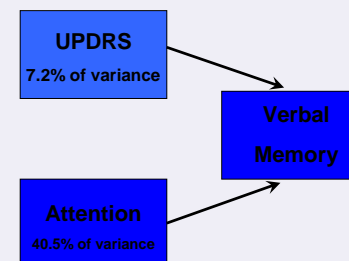
**p < .001; p < .01; p < .05; p < .10.**

## VERBAL MEMORY SCATTERPLOTS



## What Predicts Verbal Memory in Non-demented Individuals with Parkinson's Disease?

Attention and motor functioning were the only independent predictors of verbal memory in a stepwise regression analysis.



Variables excluded:

- Depression
- Anxiety
- Naming
- Dementia Rating Scale
- Mood X Attention

## What Predicts Nonverbal Memory?

Attention was the only independent predictor of nonverbal memory in a stepwise regression analysis.



Variables excluded:

- Depression
- Anxiety
- Naming
- UPDRS score
- Dementia Rating Scale
- Mood X Attention

## SUMMARY & CONCLUSIONS

- ✓ Significant associations exist between memory and measures of psychiatric, motor, and cognitive functioning.
- ✓ Attention was the only predictor of verbal and nonverbal memory after controlling for motor-related impairment.
- ✓ Results highlight the importance of interpreting memory test performance in light of intact attentional abilities when assessing memory functions in non-demented PD.

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