Clinical Utility of the “N-back” task in Detection of Working Memory Impairment in Parkinson’s Disease

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RESULTS (cont.)

Does the N-back have potential clinical usefulness?

3 discriminant analyses were performed:
1) 2-back accuracy as only predictor variable
2) digit span backwards as only predictor variable
3) both 2-back and digit span backwards as predictor variables.

The jackknife procedure was performed to provide the most conservative and replicable estimate of classification.

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>% Subjects Correctly</th>
<th>Predicts group</th>
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</thead>
<tbody>
<tr>
<td>in Discriminant</td>
<td>classified m</td>
<td>membersh ip better</td>
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<tr>
<td>Analysis</td>
<td>cross-validation</td>
<td>than chance?</td>
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<tr>
<td>2-back accuracy</td>
<td>71% yes (χ²(1) = 6.66, p &lt; .01; Wilk's λ = .83)</td>
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<tr>
<td>digit span backwards</td>
<td>67% no (χ²(1) = 2.4, p = .12, Wilk's λ = .92)</td>
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<tr>
<td>2-back accuracy + digit span backwards</td>
<td>60% no (χ²(2) = 3.9, p = .14, Wilk's λ = .86)</td>
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CONCLUSIONS

OBJECTIVE 1:
Controls performed significantly better than PD patients in terms of accuracy on the 2- and 3-back. Interestingly, control reaction times did not significantly differ from those of PDs, although there was a trend in this direction.

• PD patients may have a reduced WM capacity and when WM capacity is pushed to the limit, deficits emerge. This notion is supported by previous studies in which impairment in WM was found in PD patients once item storage became constrained by larger set size (Lange et al., 1992; Morris et al., 1988; Owen et al., 1992, 1997)

• An alternate interpretation: PD patients are simply more vulnerable to deterioration in performance as task difficulty level increases, and impairment observed is not specific to WM processes per se

OBJECTIVE 2:
• Results of our discriminant analyses suggest that the n-back is only slightly more useful than digit span backwards at classifying neurologically impaired patients

• Combined with other measures, the n-back has the potential to be useful in the context of a computerized battery designed to detect impairment in “frontal lobe functioning”

• Ideally, a factor analysis should be conducted with the N-back and various other WM tests (e.g., PASAT) to determine what proportion of their variances are accounted for by the construct of working memory

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