Analysis of the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) Cortical-Subcortical Deviation Index in Differentiating Between Cortical and Subcortical Dementia Profiles

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Introduction

The **RBANS cortical-subcortical index (CSI)** was developed to aid in **classification of cortical versus subcortical cognitive profiles.**

- 93% accuracy classifying Alzheimer's patient and Huntington's patients
- Lower classification rates in veteran outpatients and older adults
- Higher rates of cortical classification among normal controls
- Best predictors: memory, specifically delayed memory

Our study sought to:

- **Determine the accuracy of the CSI** in a hospital outpatient setting
- **Identify which RBANS subtests most contributed to the cortical and subcortical differentiation**
- **Identify the optimal cut score** in a hospital outpatient setting

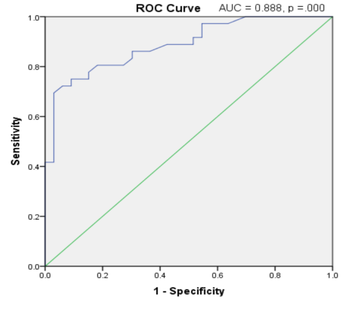
Methods

- **Subjects:** consecutively enrolled adults in an outpatient hospital-based neuropsychology clinic in a large urban medical center in the Gulf South. Diagnosed with dementia or mild cognitive impairment:
  - Exclusion: mixed dementia, delirium, or failed performance validity indicators.
  - Cortical: Alzheimer's disease
  - Subcortical: Huntington's disease, multiple sclerosis, cerebrovascular disease, Parkinson's disease
  - No Diagnosis
- **CSI formula ([visuospatial construction + attention]/2] – [delayed memory + language]/2)**)
- **Comparisons:**
  - Mean CSI score: one-way analysis of variance (ANOVA) and Tukey's HSD.
  - CSI cutoff: ROC analysis.
  - Subtests: Independent t-tests for CSI subtests, with stepwise regression to evaluate significant subtests.

True Class

Predicted Class	Cortical	Subcortical
Cortical	32 (TP)	1 (FP)
Subcortical	3 (FN)	33 (TN)

*Cortical treated as in-group

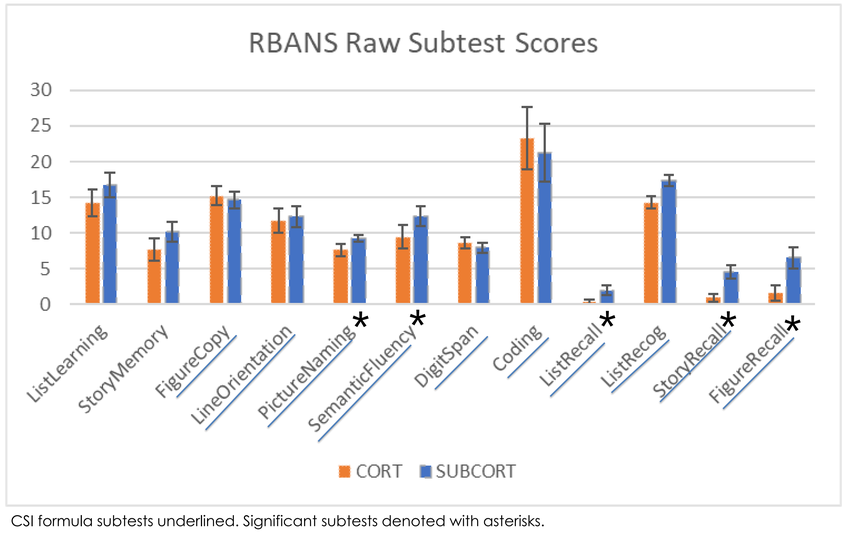


Demographic Information

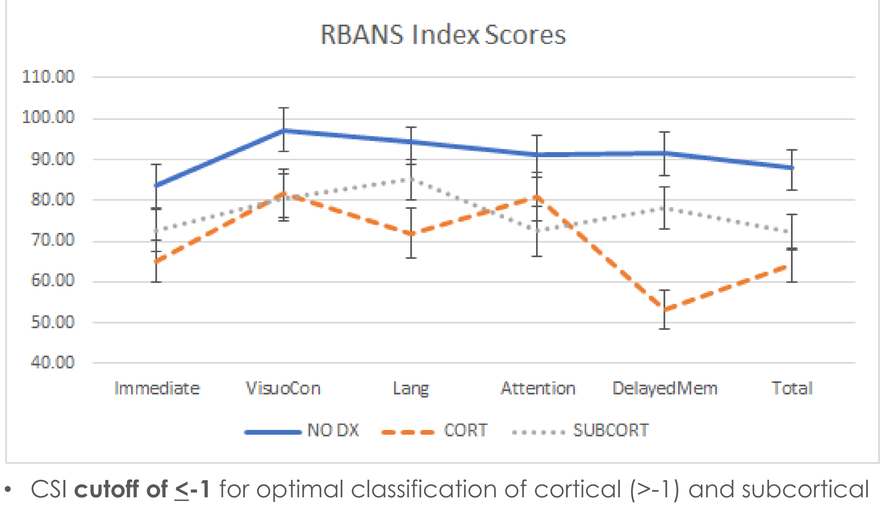
	Cortical *n*=33	Subcortical *n*=36	No Diagnosis *n*=30	Total Sample *n*=99
Age*	77.03 (6.04)$_a$	72.17 (11.51)$_b$	71.97 (5.59)$_b$	73.73 (8.60)
Education	13.55 (2.58)	12.63 (3.70)	13.24 (3.04)	13.01 (3.51)
Sex (% Female)**	88%$_a$	50%$_b$	80%$_a$	73%
Race (% Caucasian)	91%	75%	70%	78%
CSI score**	18.71 (13.88)$_a$	-5.11 (13.21)$_b$	1.30 (11.56)$_b$	4.77 (16.43)

*p<.05; **p<.01
Subscript letters denote non-significant differences

Results



CSI formula subtests underlined. Significant subtests denoted with asterisks.



- CSI **cutoff of ≤-1** for optimal classification of cortical (>-1) and subcortical groups (AUC=.888, SE .039, p<.001, 95%CI .813-.964, Sensitivity=.750, Specificity=.909).
- The **best CSI-prediction model explained 28% of the variance** (F[1,111]=44.06, p<.001) and included only **List Recall** (B=-2.96, p<.001)

Conclusions

- Does the CSI classify accurately in this population?
  Yes, AUC was .888
- How should it be used?
  Optimal cut score was <-1
- Which subtests mattered most?
  5 subtests were statistically significant predictors, but **the best model only included List Recall**

Considerations

- Differences between cortical and subcortical groups and the impact of delayed memory were **largely consistent with prior** studies.
- Controls were not statistically different from the subcortical group on CSI **in contrast with** Duff and colleagues (2007), which showed a largely "cortical" sample of normal controls. This may, in part, reflect regional health characteristics, such as underlying rates of cerebrovascular disease.
- Limitations included a small sample size, the redundancy of using RBANS scores to determine original diagnostic category, and baseline differences between groups.
- Future studies should further examine the clinical utility of the CSI as well as the relative diagnostic value of the RBANS at a subtest level in similar populations.

References

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