Diagnostic Classification & Dementia Severity in CVLT-II-SF Forced Choice Recognition: Implications for Effort Assessment

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Introduction

Purpose

Investigate whether performance on a measure of suboptimal effort changes as a function of cognitive status and has a relationship to the severity of cognitive impairment.

Rationale

- Though less prevalent, suboptimal effort can occur in dementia samples for various reasons (e.g., fatigue, testing opposition).[1,2]
- Effort testing in dementia becomes complex due to specificity concerns[3], and performance potentially falling below the suboptimal effort threshold[4]; performance may also vary as a function of impairment severity[3,5,6].
- The California Verbal Learning Test II (CVLT-II) Forced Choice Recognition subtest (FCR), is an embedded test of effort employed in cognitively impaired populations (e.g., TBI) with a suggested cut score of a single error[7].
- The Short Form (CVLT-II-SF) has seen little investigation; limited evidence mirrors the single error threshold for effort[8].
- Concerns have been raised about the CVLT-II FCR's appropriateness for effort testing in cognitively compromised populations[9], but little literature exists for the short form.

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Methods

- Secondary analysis of RRMC clinical data.
- Individuals were classified as Subjective Cognitive Impairment (SCI), amnestic-Mild Cognitive Impairment (a-MCI), and Alzheimer's disease (AD).
- A one-way ANCOVA was run to assess differences in FCR between SCI, a-MCI, & AD.
- Regression analysis was used to model FCR scores as a function of cognitive severity
- Simple slopes were then derived to examine the within group effects of severity on function

Table 1. *Descriptives and demographics between groups.*

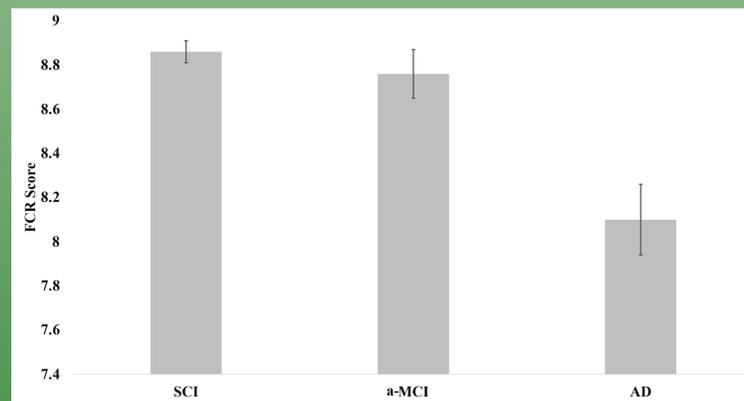| Characteristic	SCI	a-MCI	AD
n	92	18	70
Sex	46 male; 46 female	12 male; 6 female	13 male; 57 female
Mean Age	59.01 (12.99); 63.51 (10.39)	74.46 (5.86); 71.31 (9.43)	75.11 (4.82); 74.07 (4.82)
Average Yrs Education	12; 12	10; 10	9; 9

Figure 1. Visualization of ANOVA findings for FCR score in three different cognitive groups: SCI, a-MCI, and AD. Error bars reflect the standard error.

Table 2. Performance of CVLT-II-FCR as a Function of Cognitive Group and MMSE score

Parameter	Estimate	Std. Error	Significance (p-value)
Intercept	7.506	.664	<.001
Cognitive Group	-.801	.371	.033
MMSE score	.061	.030	.042
MMSE*Cognitive Group	.041	.018	.022

Table 3. Performance on CVLT-SF-II-FCR as a function of Cognitive Group and CDR-SOB sum score.

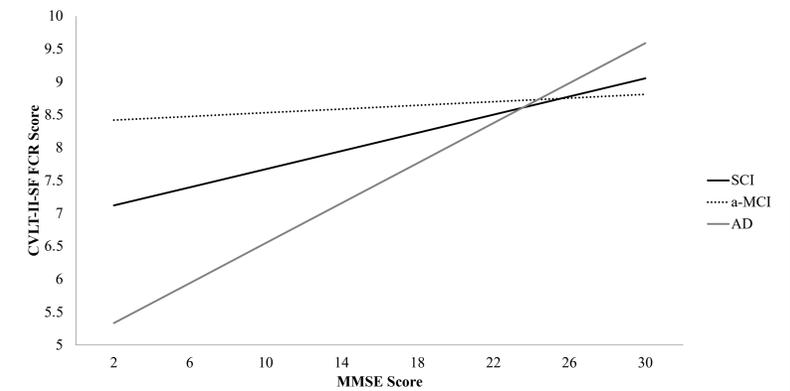| Parameter	Estimate	Std. Error	Significance (p-value)
Intercept	8.133	1.232	<.001
CDR-SOB	-.050	.085	.559
Cognitive Group	-.848	.635	.183
CDR-SOB*Cognitive Group	-.063	.046	.168

Results

Figure 2. Simple slopes for the MMSE-FCR association as a function of diagnostic group (SCI, a-MCI, and AD). MMSE score was centered on the sample median of 25. Simple slopes for the SCI and AD group were significant (p < .05), whereas a-MCI was not significant.

- Patients with AD have significantly lower FCR scores than either SCI or a-MCI cognitive groups.
- Impairment severity, as measured by MMSE is a significant predictor of FCR (p < .01); CDR-SOB is not (p = .553).
- Similar decrease in MMSE for patients with a more severe diagnosis predicts a greater decrease in FCR performance (p <.01)

Discussion

- Results indicate that neurodegenerative processes ought to be considered when interpreting FCR scores[3].
- An effort cut-off score of 8/9 on CVLT-II-SF FCR may not be appropriate for patients with dementia, or similar conditions resulting in brain insult[10,11].
- CDR-SOB did not predict FCR performance, possibly due to the scales joint emphasis on functional & cognitive aspects of AD[12,13].
- Increases in severity may be more detrimental for those with more serious clinical diagnoses. (e.g., a 5-point decrease in MMSE represents a corresponding decrease in FCR of 0.345 points for someone with SCI, but 0.760 points for someone with AD)
- The greatest limitation of this study was sample size, particularly in the a-MCI cognitive group. Further research should aim to expand sample size and investigate the longitudinal changes in patients as cognitive decline progresses.