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Background

- Estimated 50% of HIV+ individuals will exhibit cognitive impairment during their lifetime despite benefits of combination antiretroviral therapy (cART)¹
- Although lower rates of impairment are seen among HIV+ individuals on cART, impairment persists, even among this subgroup with suppressed plasma HIV RNA (cART VS)²⁻⁴
- Further research is needed on cognitive trajectories among cART VS individuals to provide a framework for understanding mechanisms of detrimental change

Objectives

Aim: To examine longitudinal changes over 4 years in a large sample of cART VS women

Hypothesis 1a: Consistent with our cross-sectional work⁵, HIV+ women would perform worse than HIV- women on learning, memory, and attention

Hypothesis 1b: cART VS women would perform worse than HIV- women but better than HIV+ women without systematic viral control (NVS) on global Neuropsychological (NP) test performance, learning, memory, and attention

Participants

Baseline sample characteristics	cART VS (n=239)	NVS (n=392)	HIV- (n=301)
Demographics			
Age (years), M (SD)***	47 (8)	46 (9)	43 (10)
Years of education, M (SD)	12 (3)	12 (3)	12 (3)
WRAT-3 reading subtest, M (SD)	93 (17)	91 (18)	90 (18)
Race/ethnicity, n (%)*			
Black, non-Hispanic	146 (61)	263 (67)	207 (69)
White, non-Hispanic	38 (16)	42 (11)	21 (7)
Hispanic	39 (16)	74 (19)	60 (20)
Other	16 (7)	13 (2)	13 (4)
Annual household income ≤\$12,000/year, n (%)	93 (39)	192 (49)	146 (48)
HIV-related clinical characteristics			
Lowest CD4 count, median (IQR)***	244 (197)	170 (183)	-
Current CD4 count, median (IQR)***	657 (359)	437 (370)	-
Plasma HIV RNA, Median (IQR)***	48 (0)	360 (5838)	-
cART use over 4-years, n (%)***			
Consistent use	239 (100)	220 (56)	-
Intermittent use	-	172 (44)	-
cART adherence ≥95%, n (%)***	216 (91)	212 (74)	-
ART duration (years), M (SD)***	12 (4)	10 (5)	-

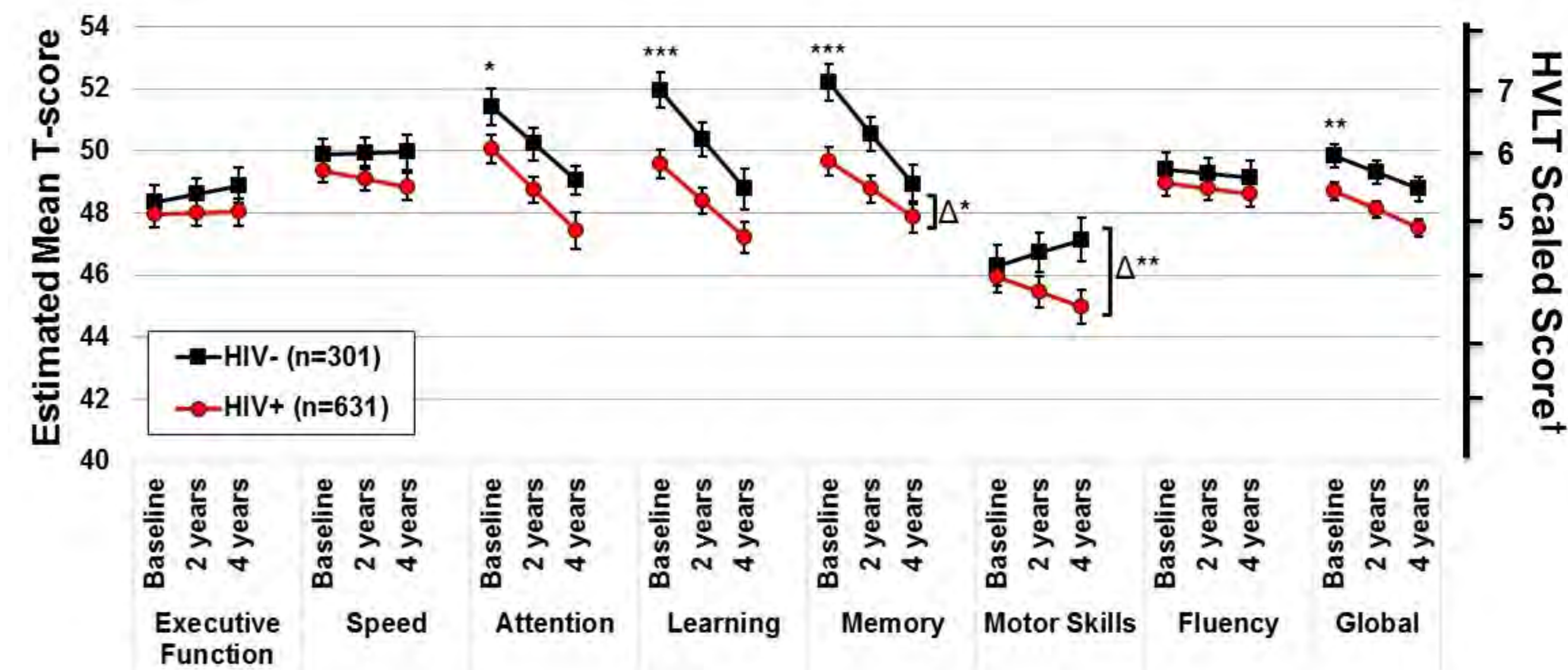
***p<0.001; *p<0.05; cART=combination antiretroviral therapy; VS=virally suppressed; NVS=refers to non-virologic suppression; WRAT-3=Wide Range Achievement Test standard score; ART=antiretroviral therapy; IQR=interquartile range; Variables reported as n (%) were analyzed with Chi-square tests. Variables reported as M (SD) were analyzed with one-way ANOVA. Variables reported as median/IQR were analyzed with Wilcoxon-Mann-Whitney test.

Methods

- Longitudinal WIHS data through Sept 2015 were extracted in April 2016. <https://statepi.jhsph.edu/wihs/wordpress/>
- Exposure Variable:**
 - cART use: categorized as cART, sub-cART, or no ART
 - Plasma HIV RNA: undetectable (≤48 cp/mL) or detectable
- NP test battery:** began 2009 & administered biennially
- Analyses:** Mixed-effects regressions were used to examine group differences on NP performance controlling for relevant covariates

Results

HIV+ women show lower T-scores compared to HIV- women



***p<0.001; *p<0.01; p<0.05; Δ=group differences in the rate of change
Norman et al., J Clin Exp Neuropsychol (2011); HVLIT=Hopkins Verbal Learning Test

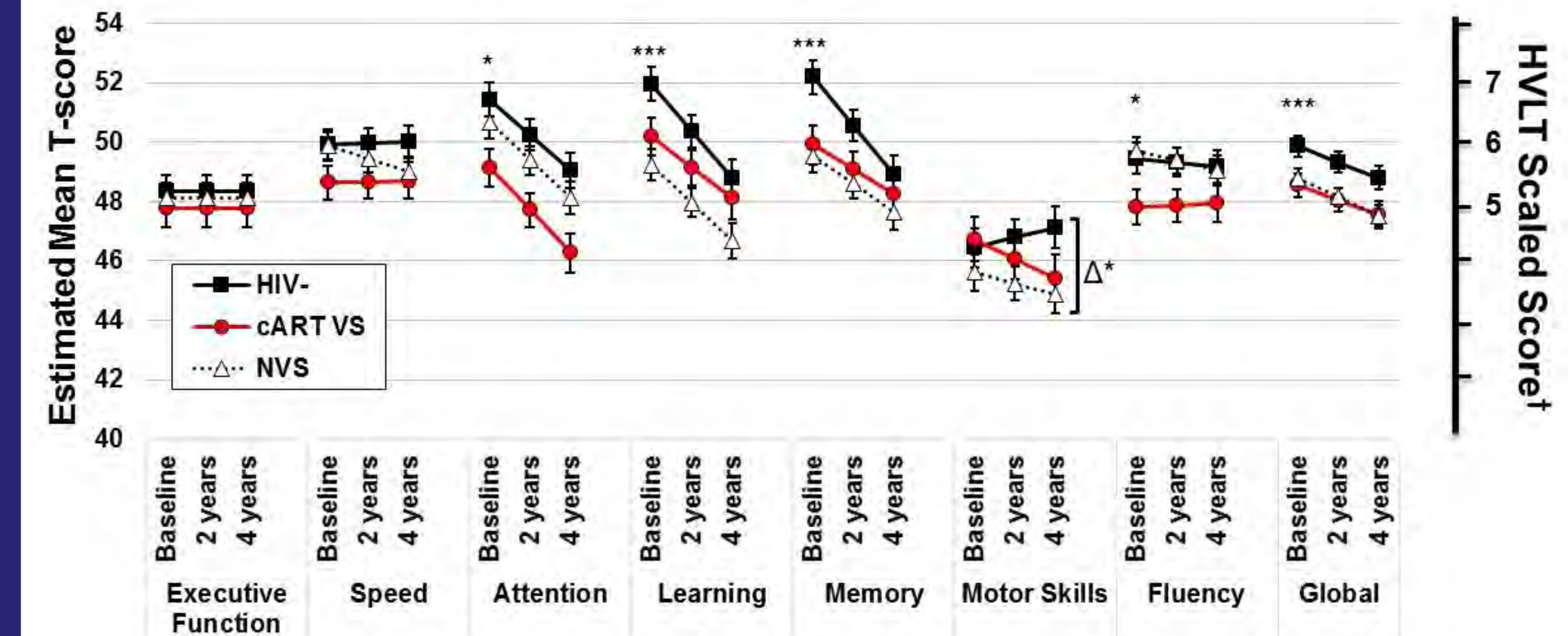
HIV+ women demonstrate:

- Initial & continued difficulties in learning, memory, attention, & global NP function vs. HIV- women

HIV clinical predictors of cognitive performance

- AIDS diagnosis associated with 0.9-1.6 lower T-score on memory, attention, executive function, & global NP score (p's<0.05)
- Lowest CD4 count negatively associated with attention (p=0.005)
- Efavirenz use associated with 1.3-1.4 lower T score on fluency & attention (p's<0.05)
- Every 10% increase in the proportion of virally suppressed WIHS visits associated with 0.3-0.4 point higher T-score on memory, learning, executive function, speed, & global NP score (p's<0.05)

Unpacking the heterogeneity in cognitive performance among HIV+ women



***p<0.001; *p<0.01; p<0.05; Δ=group differences in the rate of change
Norman et al., J Clin Exp Neuropsychol (2011); HVLIT=Hopkins Verbal Learning Test

cART VS women demonstrate:

- Initial & continued difficulties in learning, memory, attention, fluency, and global NP function vs. HIV- women
- Greater vulnerabilities over time in motor skills vs. HIV- women
- Worse cognitive profile in other domains (i.e. attention, fluency) vs. NVS women

Conclusions

- Longitudinal findings confirm persistent cognitive impairment despite continued viral suppression
- Patterns of group differences indicates persistent vulnerability in attention, learning, memory, & fluency & and increased vulnerability in motor skills over time despite optimal suppression among HIV+ women
- Longer-term studies are needed to confirm the pattern of findings and investigate the underlying neurobiological mechanisms

References: ¹Grant et al., Int Rev Psychiatry (2008); ² Simioni et al., AIDS(2010); ³Tozzi et al., JAIDS (2007); ⁴Cysique et al., JNV (2014); ⁵Maki et al., Neurology (2015)

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