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Cognitive and Everyday Functioning in Older and Younger Adults with and without HIV

David E. Vance[1,2], **Virginia G. Wadley**[2,3], **Michael G. Crowe**[2,4], **James L. Raper**[5], and **Karlene K. Ball**[2,4]

[1]School of Nursing, University of Alabama at Birmingham, Birmingham, Alabama

[2]Edward R. Roybal Center for Translational Research in Aging and Mobility, University of Alabama at Birmingham, Birmingham, Alabama

[3]School of Medicine, Division of Geriatrics, Gerontology, and Palliative Care, University of Alabama at Birmingham, Birmingham, Alabama

[4]Department of Psychology, University of Alabama at Birmingham, Birmingham, Alabama

[5]School of Medicine & Center for AIDS Research, University of Alabama at Birmingham, Birmingham, Alabama

Abstract

The purpose of this study was to: (1) examine cognitive performance differences in older and younger adults with and without HIV, and (2) determine if such differences were related to a laboratory measure of instrumental activities of daily living (IADLs). Ninety-eight HIV-positive (69 younger, 29 older) and 103 HIV-negative (84 younger, 19 older) adults were evaluated on a number of cognitive measures. Controlling for a number of confounders, age by HIV status interactions were found on two cognitive measures, indicating poorer cognitive performance for those aging with HIV. Poorer performance on these cognitive measures corresponded with poorer performance on the Timed Instrumental Activities of Daily Living (TIADL) test. These findings suggest that as adults age with HIV, they may be at risk for cognitive declines that would impair their ability to engage in activities important for maintaining independent living.

Keywords

HIV; AIDS; Aging; Neuropsychology; Cognition; IADLs

Highly Active Antiretroviral Therapy (HAART) has decreased HIV-related mortality and increased the ability to age with this disease. In the United States, the number of adults with HIV who are 50 years old or older increased from 65,655 cases in 2001 to 104,260 cases in 2004, an increase of 59% in only three years (Centers for Disease Control (CDC) and Prevention, 2006). In 2005 persons 50 years of age or older constituted 15% of new HIV diagnoses, 24% of people living with HIV, 29% of people living with a diagnosis of AIDS, and 35% of AIDS related-mortality (CDC, 2008). The potential synergistic effects of aging with HIV place many at risk of new challenges that threaten their ability to age successfully. One of these challenges is the effects of cognitive aging with HIV on everyday functioning.

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Collectively, the synergistic effects of aging with HIV represent a particular problem with cognition. Hardy et al. (1999) examined cognitive functioning in a normative control group without HIV and three age groups of adults with HIV (less than 40 years old, 40–49 years old, and 50 years old and older). Their analyses revealed that increasing age, HIV status, and disease severity related to poorer cognitive functioning. Furthermore, in their examination of 501 adults with AIDS, Hinkin, Castellon, Atkinson, and Goodkin (2001) found that 87% exhibited cognitive functioning in the impaired range compared to the control group's normative data.

These findings are not consistently observed. van Gorp et al. (1994) found that out of 21 different cognitive measures, an age by HIV interaction was observed for only one measure, Trails B. Wilkie et al. (2003) found in a sample of adults with HIV that older adults did not exhibit impairments in cognitive functioning. In fact, younger adults with HIV performed worse than the older adults with HIV. This finding may be explained by the older adults with HIV being more educated and having lower levels of depression and plasma viral load.

Vance, Woodley, and Burrage (2007) administered a cognitive battery to adults with (N = 50) and without (N = 50) HIV ranging from 30 to 65 years old. The adults with HIV performed much worse on most of the cognitive measures. Despite expectations, older adults with HIV performed at comparable levels with their younger counterparts. The reason for this is not clear. Perhaps the sample size was too small or not representative of the larger HIV population. Also, the HIV population is a very heterogenous group; several confounding variables that influence cognitive ability must be considered when examining such data, including educational level, reading ability, substance use, and depression (Rabkin, McElhiney, & Ferrando, 2004).

Few studies examine how age- and HIV-associated cognitive declines influence instrumental activities of daily living (IADLs). Heaton et al. (2004) studied the impact of HIV-associated cognitive impairment on everyday functioning in a group of 267 participants with HIV (M_{age} = 39.32 years). Measures of everyday functioning included financial tasks (e.g., paying bills), a medication management task (e.g., pill dispensing), shopping (e.g., finding items), and a cooking task (e.g., following a recipe). In comparison to participants without any cognitive impairment, those with some type of impairment performed worse on the measures of everyday functioning. Specifically, lower scores on several cognitive domains (i.e., abstraction/executive function, learning, attention/working memory, verbal abilities) predicted poorer performance on everyday functioning. In a bivariate analysis, age was not found to be related to everyday functioning; however, age was not a major focus of this paper.

Hinkin et al. (2004) examined medication adherence between older and younger adults with HIV. They found that the older adults were more adherent than the younger adults (87.5% versus 78.3%). However, they did observe that older adults who were poorer adherers exhibited poorer cognitive functioning, especially on measures of psychomotor speed and executive functioning. Despite these prior studies, it is not clear whether there may be combined effects of age and HIV on the performance of everyday functioning.

The primary purpose of this study was to examine if differences in cognitive performance could be detected between older and younger adults with and without HIV. Although significant differences in cognitive performance might be detected, that does not mean that such differences are clinically meaningful. Thus, group differences on an everyday functioning task were also examined. Finally, an ancillary purpose of this study was to examine if such differences in cognitive performance were related to laboratory measures of IADLs (i.e., TIADL).

Method

Participants

Ninety-eight HIV-positive and 103 HIV-negative adult participants were recruited from the Birmingham, Alabama, area. Participants were recruited from flyers, brochures, newspaper advertisements, and word-of-mouth. Recruitment materials clearly stated that "older and younger adults with and without HIV" were welcome to participate. Such flyers and brochures were also placed in the university's HIV outpatient clinic and local AIDS service organizations.

Potential participants called the research office where the principal investigator (DEV) conducted a telephone screen to determine their eligibility. If participants were HIV-positive, they had to have known about their diagnosis for at least one year. Since a diagnosis of HIV is often associated with reactive depression and anxiety that can impact cognitive functioning (Vance, Moneyham, Fordham, & Struzick, 2008), an adjustment period of one year was used to account for this potential confound. Additional self-reported exclusion criteria included being homeless (i.e., an address was needed to send them their appointment letter and compensation for participating), pregnant, blind, or deaf, having a developmental disability, currently undergoing radiation or chemotherapy, inability to speak or comprehend English, having a history of brain trauma with loss of consciousness greater than 30 min, or having a severe neurological disorder (e.g., schizophrenia). These exclusion criteria were included to ensure that (1) participants could adequately engage in the neuropsychological tests (e.g., being able to see) and (2) did not have a significant neurological comorbidity that could obfuscate the effects of age and HIV on cognitive and everyday functioning. These criteria reflect other HIV cognitive studies designed to exclude those with neurological comorbidities (e.g, Hinkin et al., 2004).

Procedures

In this cross-sectional study, participants arrived at a university research center where they were provided a description of the study, asked to sign a consent form, and then administered the instruments below. The testing session was completed in one visit (approximately 2½ hrs). Participants were compensated $50 for their time. These testers are also well versed in neuropsychological testing based upon their involvement in other center-related research studies. Weekly staff meetings provided an opportunity for testers to review issues with testing protocols. This study received approval from the university's Institutional Review Board for Human Subjects.

Instruments

Demographic Questionnaire—This instrument is used to gather demographic information such as gender, ethnicity, sexual orientation (0 = *homosexual/bisexual;* 1 = *heterosexual*), household income before taxes, and education level (years).

Profile of Mood States (POMS)—A total mood disturbance score was calculated; higher scores on the total POMS indicated more negative affect (McNair, Loor, & Droppelman, 1992). In this study, internal consistency for the total scale was high (Cronbach's alpha = .93).

Health Questionnaire—Participants were asked a variety of questions to identify the presence of medical conditions (e.g., heart disease, diabetes). Given the focus on HIV, questions concerning CD4+ lymphocyte count, current viral load, prescribed medications, and date diagnosed with HIV were added. Duration of HIV was calculated by subtracting the date of the interview by the approximate date participants indicated they were diagnosed with HIV.

Psychoactive Drug Inventory—Participants are asked to record whether they engaged in the use of the following substances during the past week: tobacco, alcohol, cannabis, stimulants, amphetamines, benzodiazapines, sedatives, heroine, methadone, hallucinogens, and inhalants. The number of substances used was tallied and used as the psychoactive drug use score.

Trail Making Test A and B—Trails A is a proxy for attention, visuomotor tracking, and psychomotor ability. Trails B is a proxy for executive function. Reliability coefficients for this test are generally good, with several reaching .8 and .9 (Spreen & Strauss, 1998; Reitan, 1979). Scores for both Trails A and B are measured in time (sec) required to complete the task with less time indicating better cognitive functioning.

Finger Tapping Test—The Finger Tapping Test is a measure of psychomotor ability. Higher scores indicate better psychomotor ability. The Finger Tapping Test is highly reliable for men ($r = .94$) and women ($r = .86$) (Lezak, 1995; Spreen & Strauss, 1991).

Letter Comparison and Pattern Comparison—These tests measure processing speed. Larger scores reflect better cognitive functioning (Salthouse, 1991).

Wechsler Memory Scale-III Digit Span—This test measures verbal working memory; a higher score indicates better verbal working memory (Weschler, 1981).

Wechsler Memory Scale-III Spatial Span—This test measures spatial working memory; a higher score indicates better spatial working memory (Weschler, 1981).

CLOX—The CLOX is a clock drawing task that measures visuospatial function and executive control. CLOX scores range from 0–15 with lower scores reflecting greater impairment. A high degree of inter-rater reliability has been found (CLOX 1, $r = .94$; CLOX 2, $r = .93$) (Royall, Cordes, & Polk, 1998).

Useful Field of View (UFOV®)—UFOV®, a computer measure of visual processing speed and attention, consists of four increasingly complex subtests. In each subtest, several presentations (17–500 ms) are displayed in order to determine the quickest speed in which visual information is accurately processed. In each subtest, an algorithm is used to determine the presentation speed in which the participant correctly completes the task 75% of the time. The optimal presentation speed for all four subtests is combined; fewer ms to correctly perceive the target reflect faster speed of processing. Test-retest reliability is high (Edwards et al., 2005).

Complex Reaction Time (CRT)—The CRT is a computer-administered test of everyday visual search skills. Fewer sec reflect faster search skills. Test-retest reliability of CRT is acceptable ($r = .56$) (Ball & Owsley, 2000).

WAIS Digit Symbol Substitution and Copy—This test measures executive functioning for the substitution test and psychomotor speed for the copy test. In the substitution test, higher scores reflect better executive functioning. In the copy test, less time reflects better psychomotor functioning (Weschler, 1981).

Timed Instrumental Activities of Daily Living (TIADL)—The TIADL measures accuracy and the amount of time required to perform five tasks that approximate everyday IADLs. Tasks include finding a telephone number in a telephone book; counting out exact change with coins; finding ingredients on cans of food; finding items on a grocery shelf; and finding directions on medicine bottles. The time (sec) required to complete each task is recorded. If the task is not completed within the pre-set time limit, the test is suspended and the participant receives the maximum pre-set time limit as their score. If the task is completed incorrectly, a time penalty is added. For each of the tasks, the time is transformed into z-scores which are then equally weighted in order to form a total composite score. The test-retest reliability of TIADL is good ($r = .64$) (Owsley, Sloane, McGwin, & Ball, 2002).

Data Analysis

SPSS 11.5 was used to analyze the data. All description analyses (Tables 1 and 2) employed a significance level of $p < .05$ or $p < .01$. ANCOVAs were conducted to examine between-group differences using the Benjamini-Hochberg correction (Benjamini & Hochberg, 1995) for the primary study question (starting alpha = .05, 39 statistical tests examining age, HIV, and HIV × age main effects on the TIADL and cognitive measures; resulting alpha set at $p < .0256$). For the between-age-group differences, the demarcation of 50 and older was used; this demarcation is based upon prior HIV studies (i.e., Hinkin et al., 2004). For the ancillary study question, using pairwise deletion, partial correlations were conducted to examine the relationship between the cognitive functioning and everyday performance with alpha set at $p < .01$ (Table 2); the alpha inflation correction procedure was not used in these analyses; however, this table only serves to show the relationship between the cognitive measures and the TIADL test.

Results

Of the adults with HIV, 68 were African American and 28 were women ($M_{age} = 45.25$ years, range = 23 – 67). Twenty-nine (29.6%) HIV-positive participants were over 50. Adults with HIV were diagnosed on average for 12.05 years (range = 1 – 28 years). Seventy-five participants reported their most current CD4+ lymphocyte count at 491 cells/μL ($SD = 355.91$) on average and 80 participants reported their most current HIV-1 RNA viral load at 18,574 copies/mL ($SD = 112,823$) on average. CD4+ lymphocytes normally range from 589 – 1,505 cells mm^3 (Fishbach, 2000). A diagnosis of AIDS is made when an HIV-infected person has less than 200 CD4+ lymphocytes/uL (CDC, 1992). HIV viral load that is less than 50 copies/ml or “undetectable” is considered excellent and indicative of good viral suppression attributed to HIV medications (Kirton, 2001). In this sample, 50 HIV-positive participants had an undetectable viral load and 10 had a CD4+ lymphocyte count less than 200. Of the adults without HIV, 64 were African American and 76 were women ($M_{age} = 37.87$ years, range = 20 – 64).

Group differences were observed between the HIV-positive and HIV-negative group on age, gender, sexual orientation, household income, education, number of medical conditions, number of medications, psychoactive drug use, and POMS score. The HIV-positive sample was older, more likely to be male and homosexual, have fewer years of education, less household income, more medical conditions and medications, poorer mood, and engaged in more psychoactive drug use. Because of these differences, these factors were controlled for statistically in the subsequent analyses. To avoid issues regarding multicollinearity between education and income, only education was controlled statistically.

Group Differences on Cognition and TIADL

Controlling for the group differences, cognitive scores were examined between the older and younger adults with and without HIV. Adjusted means for the measures are presented in Table 1. Using the Benjamini-Hochberg correction method (Bejamini & Hochberg, 1995) for this analysis ($p < .0256$), significant differences between the HIV serostatus groups were observed on 11 of the 12 cognitive tests (in order from smallest to largest significant *p*-value -- Spatial Span, CRT, Digit Substitution, UFOV®, Trails A, Pattern Comparison, Digit Span, Letter Comparison, Finger Tapping Test, Digit Copy, and Trails B). The HIV-positive group performed worse on these cognitive measures compared to the HIV-negative group. Significant differences between age groups were observed on 5 of the 12 cognitive tests (in order from smallest to largest significant *p*-value – Letter Comparison, Pattern Comparison, UFOV®, Digit Copy, and Digit Substitution); the younger group performed better on these cognitive measures than the older group. Age by HIV interactions were observed on 2 of the 12 cognitive tests (in order from smallest to largest significant *p*-value – Trails A and CRT); older adults with HIV performed worse on these cognitive measures than the other groups. Furthermore, the trends on all of the cognitive tests showed that older adults with HIV perform worse.

Again, controlling for group differences, TIADL differences were examined between the older and younger adults with and without HIV. Adjusted means on this measure are reported in Table 1. Age and HIV effects were observed; older adults and those with HIV performed worse on this measure. Furthermore, the trend on the TIADL showed that older adults with HIV performed worse on this laboratory measure of everyday functioning.

Association between Cognition and TIADL in HIV Adults

Controlling for the same group differences, Table 2 highlights the partial correlations between cognitive performance scores and the TIADL scores for the HIV-positive adults. As can be seen, most of the cognitive measures were significantly ($p < .01$) associated with the TIADL performance scores in the expected directions; better cognitive performance was associated with less time needed to complete the tasks in the TIADL.

Association with Chronicity and Disease Severity

Long-term exposure to HIV and disease severity may affect cognitive and everyday functioning (Vance, Woodley et al., 2007). Years diagnosed with HIV is used as a measure of chronicity of nervous system exposure to HIV. In Table 2, no relationship emerged between years diagnosed with HIV and performance on the cognitive and TIADL measures. As indicators of disease severity, CD4+ lymphocyte counts and viral load were not associated with performance on the TIADL or the cognitive measures.

Discussion

The primary purpose of this study was to examine the effects of aging with HIV on cognitive and everyday functioning. Potential negative effects of aging, HIV, and aging with HIV were found. Older adults with HIV performed significantly worse on Trails A and CRT, measures of attention, visual search, and psychomotor ability. Although the trends showed that older adults performed consistently worse on all of the cognitive measures, the fact that more age by HIV interactions were not found was somewhat surprising. However, the findings in the literature are mixed. Perhaps in general, older adult HIV survivors are a select sample that represents a more hardy and medication-adherent group than younger adults with HIV (Hinkin et al., 2004; Vance, Struzick, & Masten, 2008). Likewise, there is a great amount of individual differences that may obfuscate the findings. For example, in examining the means of Trails B, it is clear that older adults with HIV are performing much worse as a group; however, the standard deviations are extremely large which suggests such individual differences exist and may prevent significant differences from being detected. Thus, hardiness and/or individual differences may work against finding the expected interaction of age and HIV status.

These results parallel the literature, demonstrating that aging with HIV may have some effect on cognitive functioning. There were two measures on which older adults with HIV performed significantly worse. Since this was a community-based sample that was healthy enough to come to the center, findings may not reflect the cognitive abilities of other older adults with HIV who may be more medically and cognitively compromised. Furthermore, with the advent of HAART, most HIV infected adults who have access to medications are responding well to treatment and may not suffer from the frank cognitive impairments observed earlier in the HIV epidemic (Ferrando, Rabkin, van Gorp, Lin, & McElhiney, 2003).

This point was further accentuated by the examination of years diagnosed with HIV, CD4+ lymphocyte count, and viral load. The lack of findings may suggest two things. First, in the HAART era, the cognitive and everyday functioning declines may be less pronounced due to HIV treatment (Ferrando et al., 2003). Second, the HIV population is a very heterogeneous group, with substantial variability in cognitive and social resources as well as lifestyle (e.g., substance abuse). As previously suggested, some individuals may be “hardier” in general or become more “hardy” through aging with HIV and therefore more resistant to the effects of depression, stress, substance use, and other factors that are negatively correlated with cognitive performance (Vance, Struzick et al., 2008). However, some people may be genetically hardier which may promote better cognitive aging and survival. Burt et al. (2008) found that in a large sample that those with HIV with the apolipoprotein ε4/ε4 genotype, the alleles associated with Alzheimer’s disease, experience more rapid HIV disease progression than those without this genotype. In vitro analysis demonstrates that these specific apolipoproteins facilitate cell entry of HIV; this accelerates disease progression of HIV (Burt et al., 2008). In lieu of this study, those able to age with HIV may be the one’s less likely to have the ε4/ε4 genotype associated with cognitive declines associated with HIV.

This study found that in adults with HIV, older age and impaired cognitive functioning were significantly associated with worse performance on a laboratory measure of IADLs (i.e., TIADL). When examining which cognitive measures relate to the TIADL (Table 2), it appears that all cognitive measures do. These values quantify a relationship between cognitive ability and everyday functioning; this suggests that as adults with HIV experience cognitive declines, this will also impact the speed and accuracy in which they perform their everyday functioning. This can contribute to less personal productivity and a decline in quality of life.

Clinical Implications

Given the numerous main effects of age and HIV on cognitive and everyday functioning measures observed in this study, concerns remain that as adults age with HIV, they will be at risk for cognitive declines that threaten their everyday functioning and quality of life. These concerns focus on the subtle but cumulative neurological damage that may occur by aging with HIV. For example, increased comorbidities and medication toxicity that accompany aging and HIV may tax one’s physiological resources that underpin cognitive functioning. This holds special consideration for medication adherence. Older adults with HIV undergoing cognitive declines experience poorer adherence to their HIV medications (Hinkin et al., 2004).

Vance, Dawson et al. (2007) administered a computerized speed of processing training program to normal, community-dwelling older adults; this consisted of 10 1-hr sessions designed to increase the rate in which adults process visual information. Compared to a control group, those who received this cognitive remediation therapy improved on measures of visual speed of processing; such effects were robust over a 2-year period. Such training may be effective in improving cognitive functioning in older adults with HIV. In an on-going study, Vance, Marceaux, Fazeli, McKie-Bell, and Ball (2009) used a similar protocol in 17 adults with HIV and found statistically significant gains in visual speed of processing. This approach represents a way to help older adults with HIV maintain their cognitive functioning.

Strengths and Limitations

Two obvious strengths are recognized in this study. First, reliable and validated measures of cognition, IADLs, and mood were used. Second, this study is one of the few to examine the relationship between cognitive functioning and IADLs using a performance-based measure (i.e., TIADL) rather than self-report of everyday function.

A few limitations common to HIV studies are also noted. First, there are difficulties associated with recruiting an HIV-negative population that matches an HIV-positive population on key demographics (e.g., income) and psychosocial variables (e.g., mood). It is often expected that the HIV-positive sample will differ from the HIV-negative sample on a number of variables such as depressive symptomatology and income since many adults with HIV/AIDS may not work (Vance, Wadley et al., 2007). Yet, to find an HIV sample void of many of the characteristics seen in this population would be difficult, not to mention that the findings would fail to be generalizable. Second, social desirably may hinder efforts to obtain valid data on variables known to impact cognitive performance such as admitting substance use. Third, many participants were unable to recall their most recent CD4+ lymphocyte count and viral load; such self-reports can be inaccurate. Finally, the effects of cognitive performance on the TIADL were not examined between groups; however, this is a logical next step in the literature and for these data.

Conclusion

Two age by HIV interactions were observed on the cognitive and everyday functioning measures, suggesting that those who are aging with HIV may be at increased risk for declines in these areas. The study of aging with HIV is still relatively new, with small samples of much older adults in their 60s and 70s only beginning to be recruited and included in analyses. Therefore, there is continued need to examine the extent and prevalence of cognitive and functional deficits that may be exacerbated by factors such as psychoactive drug use, depression, and disease status. Furthermore, as the evidence continues to mount suggesting some risk of cognitive impairment in older adults with HIV and the possible associated negative impact on the lives of those affected, it is increasingly important to explore effective strategies for intervention.

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Table 1

Adjusted Means and Standard Deviations (N = 201) for the TIADL and Cognitive Tests

	Younger HIV-Positive (*n* = 69)	**Older HIV-Positive (*n* = 29)**	**Younger HIV-Negative (*n* = 84)**	**Older HIV-Negative (*n* = 19)**
Trails A *H, HxA	36.77 (20.60)	53.76 (19.08)	34.04 (22.01)	30.13 (17.62)
Trails B *H	134.46 (107.57)	186.14 (99.64)	110.26 (114.95)	109.96 (92.03)
Finger Tapping Test *H	46.70 (10.33)	44.97 (9.57)	51.41 (11.04)	51.79 (8.84)
Letter Comparison *A, H	46.56 (12.16)	39.48 (11.26)	52.64 (12.99)	47.34 (10.40)
Pattern Comparison *A, H	31.39 (8.61)	26.69 (7.98)	36.35 (9.20)	32.55 (7.37)
Digit Span *H	9.28 (2.72)	8.76 (2.51)	10.79 (2.91)	10.40 (2.32)
Spatial Span *H	7.28 (2.63)	5.84 (2.44)	8.53 (2.81)	8.48 (2.25)
CLOX	12.00 (1.82)	11.42 (1.69)	12.32 (1.94)	12.56 (1.56)
UFOV® *A, H	645.51 (335.40)	810.44 (310.66)	463.26 (358.42)	567.08 (286.97)
CRT *H, HxA	1.75 (0.93)	2.47 (0.86)	1.48 (1.00)	1.36 (0.78)
Digit Copy *A, H	86.06 (28.55)	102.55 (26.44)	76.05 (30.50)	81.73 (24.42)
Digit Substitution *A, H	45.48 (16.36)	39.54 (15.15)	56.62 (17.48)	51.44 (14.00)
Total TIADL *A, H	0.17 (4.82)	2.80 (4.46)	−1.02 (5.15)	−0.41 (4.12)

Notes. CRT = Complex Reaction Time test; TIADL = Timed Instrumental Activities of Daily Living test; UFOV® = Useful Field of View test;

* = Significance determined by the Benjamini-Hochberg, technique for the main effects of age = A, HIV = H, or the HIV × age interaction = HxA.

Table 2

Partial Correlation Matrix between Cognition and TIADL Score in HIV-Positive Adults (N = 98)

Partial *R*	Age	Years Diagnosed with HIV	CD4+ Lymphocyte Count	Viral Load	Total TIADL
Age	1.00	.36*	−.09	−.04	.34*
Years DX with HIV	.36*	1.00	−.02	−.16	.13
CD4+ Lymphocyte Count	−.09	−.02	1.00	−.03	.14
Viral Load	−.04	−.15	−.03	1.00	.02
Trails A	.35*	.11	−.16	.02	.44*
Trails B	.34*	.14	−.14	−.07	.62*
Finger Tapping Test	−.18	−.03	−.30	−.10	−.24
Letter Comparison	−.40*	−.06	.23	−.08	−.40*
Pattern Comparison	−.43*	−.15	.16	.07	−.56*
Digit Span	.03	.11	.00	−.05	−.32*
Spatial Span	−.26	.02	.17	.01	−.35*
CLOX	−.18	−.12	−.02	.14	−.29*
UFOV®	.26	.00	−.11	.02	.42*
CRT	.33*	.07	−.10	−.02	.55*
Digit Copy	.26	.10	−.09	−.09	.46*
Digit Substitution	−.35*	−.15	.13	.02	−.51*

Notes. CRT = Complex Reaction Time test; UFOV® = Useful Field of View test;

* $p < .01$.