IVA+Plus™
Integrated Visual and Auditory Continuous Performance Test by Joseph A. Sandford, Ph.D. & Ann Turner, M.D.

Nu-Brain Uses the IVA+Plus™ for Accurate Diagnosis of ADHD
IVA+Plus is a unique combined auditory and visual continuous performance test designed to help the clinician make an accurate diagnosis of ADHD for individuals ages 6 through adult. Following the diagnostic criteria outlined in the DSM-IV, IVA+Plus provides data to help diagnose and differentiate between the four sub-types of Attention-Deficit/Hyperactivity Disorder:

1. ADHD Predominantly Inattentive Type (formerly called ADD),
2. ADHD Predominantly Hyperactive-Impulsive Type,
3. ADHD Combined Type, and
4. ADHD Not Otherwise Specified.

The IVA+Plus™ is Quick and Easy for Clients to Use
The main test task, which lasts approximately thirteen minutes, presents 500 trials of “1”s and “2”s in a pseudo-random pattern requiring the shifting sets between the visual and auditory modalities. The subject is required to click the mouse only when he sees or hears a 1 and to inhibit clicking when he sees or hears a 2. During some segments of the test, the 1s are more common than the 2s, creating a response set which “pulls” for errors of commission, or impulsivity. During alternating segments of the test the 1s occur rarely; this invites more errors of omission, or inattention, since the subject must remain vigilant while he waits for a 1 to occur.

The IVA+Plus™ Provides a Wealth of Data
All scores are presented both as raw scores and as quotient scores. The basis for statistical analysis is the same as that used for most IQ tests; all quotient scores have a mean of 100 and a standard deviation of 15. Applying these familiar interpretative guidelines makes it easy to interpret test results.
IV A+Plus’s scores are divided into four categories:
  • Attention
  • Response Control
  • Attribute
  • Validity

The primary diagnostic scales are the:
  • Full Scale Response Control Quotient
  • Full Scale Attention Quotient

The **Full Scale Response Control Quotient**

is based on separate Auditory and Response Control Quotient Visual scores. These Response Control Quotient scores are derived from visual and auditory Prudence, Consistency and Stamina scales:
  • Prudence is a measure of impulsivity and response inhibition as evidenced by three different types of errors of commission.
  • Consistency measures the general reliability and variability of response times and is used to help measure the ability to stay on task.
  • Stamina compares the mean reaction times of correct responses during the first 200 trials to the last 200 trials. This score is used to identify problems related to sustaining attention and effort over time.

The **Full Scale Attention Quotient**

is derived from separate Auditory and Visual Attention Quotients. The Attention Quotient scores are based on equal measures of visual and auditory Vigilance, Focus and Speed:
  • Vigilance is a measure of inattention as evidenced by two different types of errors of omission.
  • Focus reflects the total variability of mental processing speed for all correct responses.
  • Speed reflects the average reaction time for all correct responses throughout the test and helps identify attention processing problems related to slow discriminatory mental processing.

The **Fine Motor Regulation scale**

provides additional information by recording off-task behaviors with the mouse, including multiple clicks, spontaneous clicks during instruction periods, anticipatory clicks and holding the mouse button down. In behavioral terms, the Fine Motor Regulation score quantifies fidgetiness and restlessness associated with small motor hyperactivity.

IV A+Plus’s Attribute scores

provides data regarding learning style. These scales are:
  • Balance — indicates whether the test taker processes information more quickly visually or aurally, or is equally quick in either modality.
  • Readiness — indicates whether the test taker processes information more quickly when the demand is quicker or when it is slower. This scale can provide a subtle measure of inattention when the test taker just “can’t quite keep up” with the demand.

IV A+Plus’s Validity scales

are auditory and visual Comprehension, Persistence and Sensory/Motor:
  • Comprehension identifies random responding, which would lead to faulty interpretation of other IV A+Plus scale scores. Research has shown this to be the single most sensitive sub-scale in discriminating ADHD.
• Persistence is a measure of motivation when the test taker is asked to do “one more thing.” It can also reflect motor or mental fatigue.

• The Sensory/Motor scales are used to rule out possible neurological, psychological or learning problems as evidenced by slow simple reaction time.

Well-Normed

IVA+Plus’s normative group (N=1700) is divided by gender, and grouped by age as follows: 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17-18, 19-21, 22-24, 25-29, 30-34, 35-39, 40-44, 45-54, 55-65, 66-96.

The database was primarily collected in Richmond, Texas, Michigan, California and Florida. All individuals were excluded who were in therapy, had a history of LD, hyperactivity or attention problems, who were on any type of medication (other than birth control unless >55 years of age), who had a history of neurological problems (dementia, stroke or TBI) and those who could not validly complete the test.

A relatively equal number of males and females were included in each age/sex group and an effort was made to have about 30 males and 30 females in each age group though this was not always possible. At about 30 in each group, the standard error ranged between 3-4 points on a standard scale for all the scales.

Many different ethnic groups were included in the normative sample, but this data has not been broken down. The normative data is available in the IVA+Plus program sub-directory and can be used in most cases to manually calculate the standard scores, except when the standard deviation is small and the percent raw score reported in the reports has been rounded before being displayed (mainly an issue with young adults who make few errors.)

Nu-Brain uses the IVA+Plus™ Integrated Visual and Auditory Continuous Performance Test As the Standard for an Accurate Diagnosis of ADHD

Brain Train, the Company that created the IVA for computerized ADHD assessments, provides the following report:

The Correct Diagnosis and Treatment of ADHD May Have Life or Death Consequences

ADHD can lead to an unhappy life and can sometimes have life or death consequences according to an international consensus statement issued by 75 prominent medical doctors and international researchers1.

These researchers cited studies showing that ADHD individuals are 70% more likely than normal people to have few or no friends and will engage in anti-social behavior 50% more often. Young teenage females with ADHD are 40% more likely to get pregnant. Automobile accidents and speeding tickets occur 30% more for ADHD teenagers, with failure to yield being the most frequent citation. Depression is 30% more prevalent for individuals with ADHD. Despite the prevalence and complexity of these symptoms, less than half of ADHD individuals receive treatment!

Given this plethora of problems, it is not surprising that research has also shown that ADHD children run a significantly greater risk of sustaining severe, debilitating injury or of accidental death than non-ADHD children2.

Using data submitted by more than 70 hospitals between 1988 and 1996, researchers found that ADHD children were more likely to sustain head injuries, or injuries to multiple body regions, and that these injuries led to disability in 53% of these cases.


The above findings reinforce the importance of correctly diagnosing ADHD and of identifying ways of helping this population.

**Brain Train Reports the Results Of Research Using the IVA Assessment Instrument with Adult Brain Injury and ADHD**

What is the difference between adults with ADHD and those with mild traumatic brain injury? An interesting study using the Integrated Visual and Auditory Continuous Performance Test (IVA) was just published in the Archives of Clinical Neuropsychology.

The research explores the relationship between what ADHD, mild traumatic brain-injured and normal adults report about their own neuropsychological functioning, vs. their performance on the IVA CPT.

On the IVA, the mTBI (mild Traumatic Brain Injury) and ADHD groups demonstrated very similar neuropsychological deficits, with both of these groups performing significantly lower than the normal group. The IVA scores on scales assessing divided attention, alternating attention, focus, and sustained attention were more impaired for the mTBI group than for the ADHD group, but not to a significant degree. It is interesting to note that one of the original DSM diagnostic labels for ADHD was minimal brain dysfunction. It appears that ADHD and mTBI individuals have similar attentional deficits, but these deficits stem from different causal factors.

One interesting finding mentioned in this study is that for the normal and mTBI groups, there was no correlation between age, education and IQ, and performance on the IVA. Contrary to this, individuals in the ADHD group who were older, more educated and had higher IQs performed better on the IVA, suggesting that these individuals who were better functioning in life were able to utilize their cognitive skills to help them cope and adapt to their attention deficits as they matured.

On the self-report scales, the ADHD and the mTBI groups both reported more neuropsychological deficits than the normal group. The self-report scores which assessed attention, memory and academic performance were very similar for both the ADHD and mTBI groups. However, the mTBI group reported more symptoms related to problems with cognitive efficiency, frustration tolerance, and language/verbal learning tasks than did the ADHD group.

Interestingly, these self-report scales and the IVA test results were not found to be correlated. The author concluded that these two instruments measured different aspects of neuropsychological dysfunction. He interpreted the self-report scales as primarily measuring an “affective” component of neuropsychological dysfunction. Even though these self-report data were found to be useful in differentiating ADHD and mTBI, they were not found by themselves to adequately assess memory or attention in these populations. The IVA CPT though was found to make a significant contribution as a neuropsychological measure for specifically evaluating attention and response control in both ADHD and mTBI populations. In other words, you don’t have to use a CPT, but it helps.


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