IVA-2:
Integrated Visual and Auditory CPT

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JULY 16, 2015

http://www.braintrain.com/
IVA-2
D-KEFS Design Fluency
TMT A & B
WASI-II: Full 4
WCST
WMT

And sometimes PAI and/or MCMI-III
Now you will see or hear the numbers <1> or <2>.

The numbers will come mixed up in different ways, like this:

Your job is to click the mouse when you SEE or HEAR the number <1>.

Be as quick as you can, but be careful, too.

Press <P> to practice the test.
The term CPT was first coined by Rosvold, Mirsky, Saranson, Bransome and Beck, 1956. This was originally a test to investigate the impact of brain damage on attention.

Traditionally, CPTs have only used visual but not auditory stimuli (i.e. TOVA); may under-identify ADHD children, increase false negatives.

Taylor 1994 found that “Normal” college students were significantly more impulsive (errors of commission) on auditory stimuli versus than on visual stimuli; Sandford, et al., 1995: with IVA-Plus, same results in ADHD population.
BrainTrain was founded in 1989 by Joseph A. Sandford, Ph.D., to distribute the Captain’s Log Cognitive Training System.

Dr. Sandford and Dr. Richard J. Browne, (1985) developed this program.

The first release of Captain’s Log contained 21 programs for the Apple IIE computer.

Dr. Sandford was a programmer for GTE Telenet before receiving his Ph.D. in clinical psychology from Nova Southeastern University: so he thought about how the computer could be used to benefit head-injured patients.
Captain’s Log has now been completely revised and is available for Windows XP, Windows Vista and Windows 7.

The most recent addition is the **Personal Trainer**, which helps to create customized brain training plans for use with the Captain’s Log programs.

In 1994, Dr. Sandford and Dr. Turner produced the first version of the IVA CPT, the first commercially available, combined visual and auditory continuous performance test.

IVA, was updated to IVA+Plus, then to IVA-2.

There are now **SoundSmart**, a set of auditory cognitive training programs and a visual tracking, driving program, **SmartDriver**.
IVA-Plus has been replaced by IVA-2

- The IVA-2 CPT is a test of visual and auditory attention and impulse control. Designed primarily to help in the screening, diagnosis, and quantification of the symptoms of ADHD for ages 6 to adult.

- In addition, the IVA-2 serves to objectively measure the effects and benefits of medication or therapeutic TX.

- It provides objective data about a person’s ability to concentrate and to avoid making impulsive errors.

- Following the diagnostic criteria outlined in the DSM-5, IVA-2 provides information to help clinicians diagnose ADHD/ADD.

- Testing time is about 15 minutes, with the Main Test lasting about 12/13 minutes.
Differences between IVA+Plus and IVA-2

- Test procedures, quotient scores, reliability and validity data are the same
- **Major differences (to make it DSM-5 compatible):**
  - New data analyses & interpretative reports (+ diagnostic report writer)
  - Integration of ADHD rating scale data in the reports
  - More modern computer user interface
  - Improved malingering analysis and interpretation
  - Built in report word processor
  - Researcher tool kit
  - Improved working diagnosis flowchart
  - Has billing guidelines with CPT codes.
IVA-2

- A 15-minute test for use by mental health, medical, educational professionals.
- Free online parent, teacher and self ADHD rating scales.
- Diagnostic report writer that enables you to create a one page summary report based on your comprehensive evaluation.
- Compatible for use with DSM-5™.
- Assess possible malingering.
- Can be administered by a technician.
- Provides nine unique interpretive reports
- Utilizes ten different data analyses to provide in-depth information in both table and graph format to aid clinicians in interpreting the test scores and data.
- Not to be used as standalone instrument in making a diagnosis.
7 Key Features

• The IVA-2 integrates the data from any type of rating scale you choose to use. In a new validity study, it was found to improve diagnostic accuracy from 80% to 90% for a typical mixed age group that presents for ADHD evaluation in a clinical practice.

• The IVA-2 Diagnostic Report system helps guide clinicians through the process of answering 15 or more key questions in making their diagnostic decision in accordance with DSM-5 diagnostic criteria. This procedure helps the clinician to accurately diagnose and differentiate the five different DSM types of ADHD presentations along with their modifiers, or to rule out an ADHD diagnosis.

• The new diagnostic and interpretive reports were created to help clinicians integrate clinical history, rating scale data, other clinical data and possible working diagnoses into their comprehensive ADHD evaluation.
The new clinical flowchart provides guidance to clinicians in interpreting the IVA test results and it has been improved to more specifically and accurately diagnose the five different types of ADHD presentations. But not available in manual.

Flowchart model is inherently limited, in that it can only give you general guidelines for interpreting the IVA test results.

It was not possible to incorporate all of the changes and new requirements in DSM-5 into the flowchart. For example, it does not include the data from the rating scales, clinical history, and other clinical observations provided by the examiner. These factors are all incorporated in the diagnostic and interpretive reports.
7 Key Features

• The diagnostic report system has been completely revised to provide better draft reports for clinicians to modify and easily incorporate into their full clinical evaluation. It has also been rewritten to generate reports in a more natural-sounding language. 4 reports: Diagnostic Report, Standard Report, Detailed Report, Comprehensive Report.

• The malingering analysis and interpretation report has been significantly improved and clinicians are now provided additional scales to help them identify possible malingering.

• The manual has been completely revised to make it very easy for clinicians to find the information they need in order to better understand and interpret the test scales accurately.
The new IVA-2 CPT combines the Integrated Visual and Auditory CPT with free online, self-scoring ADHD parent, teacher, and self-rating scales.

Using this diagnostic report system, you can complete an evaluation that includes your client’s clinical history, presenting symptoms, other psychological issues, clinical observations, rating scale results, and the IVA-2 test results, and make a final diagnosis based on your clinical judgment. You can then modify your report using the built-in, MS Word compatible word processor.

It is now possible for you to administer, score the test, download the ADHD rating scale results, and create an integrated and comprehensive diagnostic report in less than an hour!
Theory of IVA-2

- Based on Barkley (1993b)

- **Response control** = problems of response inhibition, sustaining effort, making consistent responses

- **Attention**: problems of inattention, loss of focus, slow processing speed

- **Global composite scores**: response control (carefulness) & attention (quickness)

- **Strategies**: Click on all 500 trials = max number of errors of commission, no errors of omission; not clicking on any = no errors of commission, max number of errors of omission

- **Need**: careful, quick, RT reliability, ability to increase speed
IVA Uses

- Can be used as part of the evaluation for ADHD.

- Can also be used as part of the evaluation for stroke, TBI, Sleep Disorder, Depression, Dementia, Anxiety, Substance Abuse and Learning Disability.

- The IVA Plus is also used to assess the impact of treatment on attention for both medication and neurofeedback. Use Comparative Analysis report; every 10 sessions of Tx.

- Can be given repeatedly in order to evaluate Tx changes; only small practice effects in normal adults.
A test of sustained attention

Presents a series of “1”s (targets) and “2”s (foils) in a pseudo-random combination of visual and auditory stimuli.

Click the mouse if you see or hear a “1” (target)

Do nothing if you see or hear a “2” (foil)

Only correct response: 1 click to target (a 1)

Intended to be mildly boring and demanding of sustained attention and to challenge ability to shift cognitive sets.

Never to be used as a stand alone instrument to make an ADHD dx.
Combines tests of impulsivity and inattention in counter-balanced design & presents each in both auditory and visual modalities.

During high demand periods (lots of 1s), it pulls for errors of commission ((hit 2) = impulsivity) by creating a response set demanding constant responding then unexpectedly requiring them to inhibit response.

During low demand periods (lots of 2s), it pulls for errors of omission ((miss 1) = inattention) by presenting a number of consecutive foils, creating response sets of non-responding then unexpectedly requiring subject to respond.

500 intermixed visual & auditory stimuli, 1.5 seconds apart: 13 minutes of boredom
Scores: many, many, many

- 2 Factors: Attention & Response Control
- 6 Global Composite Quotient Scores & 22 Scales
- **Standard scores with Mean 100, SD 15**
  - exceptional = 130;
  - superior = 120;
  - above average = 110;
  - average = 90;
  - moderately impaired = 80;
  - Severe = 70;
  - extremely (3 SD) = 60
The IVA-2 was designed for use of evaluating problems related to impulsivity and inattention & not the upper limit of attention ability; so it has a low floor.

The ceiling may not be as discriminatory.

Uses mean of 100, standard deviation of 15

Hard to get very high score; normals do not typically show high scores above >130; will make only a few errors on Vigilance

IQ is related to RT; Speed test as culture-fair estimate of IQ

Timing: Microsoft USB mouse required (not wireless); accurate to +/- 10 ms

External headphones or speakers also required (not laptop speakers) for timing accuracy

Regular mouse clicks last for only 1.3 minutes at a time
ADHD errors

- Names of scales chosen from positive perspective to produce positive feedback: “Vigilance” rather than “Inattention”

- 2 types of erroneous strategies by ADHD individuals:
  - Impulsivity: over-responding quickly and impulsively to foils (2s); miss very few targets (high scores on FSAT, but low scores on FSRC)
  - Inattention: Avoid making impulsive responses by being conservative and not clicking quickly (get high FSRC and low FSAT)
Test itself, norms have not changed: all original reliability and validity studies apply.

Manual has brief discussion of validity references.

Tinius (2003): IVA in adults with mTBI and ADHD had lower scores.

White (2005): IVA correlates with QEEG measures known to be diag. of ADHD; used Theta/Beta ratio (FDA approved EEG test for ADHD) – correlated with FSAQ at .78; PASAT & WCST did not differentiate; no other CPT validated with QEEG.

The CPT is used to evaluate attention and response inhibition.

Research regarding convergent validity and sensitivity and specificity of CPTs are useful at determining attentional difficulties but do not specify whether the source is ADHD or other disorders which impact on attention and impulsivity.

There is a correlation between the STROOP and the CPT.
Goldman 1994 & Halperin 1994 reported that visual CPT’s were not sensitive or specific.

Barkley, 1994a reported that a Visual CPT correctly classified 90% of children but had false negative rates of 37%; better than subjective rating scales.

Fine, et al., 1995): 26 kids (7-12) with independent clinical ADHD dx: IVA had 92% sensitivity, 90% specificity; dx agreement with other instruments (90% TOVA; 100% Gordon; 92% CPRS); IVA had lowest false negative (7.7% (vs 12 to 59% in others)

Manual gives other small validity studies
The manual provides limited information regarding the intercorrelations among the IVA-2 scores.

Prudence and Consistency have weak to moderate correlations (.25-.33).

Of the Attention scales, Vigilance and Speed are correlated (.21); as are visual Vigilance & Focus, & auditory Focus & visual Speed (.21 to .29).

The manual suggests that the scales are primarily independent, measuring separate aspects of attention.
There is no factor structure reported in the manual.

There is one study about the correlation between the IVA-Plus and other CPTs or ADHD measures. Showed 90% concordance for the TOVA and 100% for the Gordon Diagnostic System.

92%-100% concordance between IVA-Plus and Conners’ Parent rating scale.
Taylor (1994): normal college students were more impulsive on auditory than on visual CPT tasks.

For the IVA-Plus, Taylor 1994 found 92% Sensitivity and 90% Specificity.

The IVA CPT also correctly identified the majority of non-ADHD children (i.e., false positives = 10%).
Another validity study for a typical mixed age clinical population (ages 6 to 55) found that as part of a clinician’s comprehensive psychological evaluation combining the ADHD rating scale data with the IVA CPT resulted in a working diagnosis that was 90% accurate in diagnosing ADHD.

In addition, this study did not misclassify the majority of individuals who did not have ADHD (i.e., only 11% false positives).
Reliability

- Sandford study: n = 70, 1 to 4 weeks apart; Test Retest Reliability is .37-.75 depending on the scale. It is better for Attention scores (FAQ .74, AAQ .64, VAQ .75) and worse for Response Control (FRCQ .41, ARCQ .39, VRCQ .37).

- The scales related to Stamina and Persistence were the least reliable. The authors believe that these scales are impacted by current state and therefore affected by fatigue.

- Speed has very high reliability.

- Internal Consistency and SEM are not reported in the manual.
Practice Effects

- **Practice effects are present but for the most part are small.**

- For Composite Quotient Scores mean score changes are 3% or less.
IVA-2 Norms

- N= 1700 “normals”, ages 5 to 90
- Ages 5 up, but **unreliable until 7** (if ok IVA, pre 7 then no ADHD)
- Most CPT tests have 50 % false negative rate; IVA had 7.7%
The normative group (N=1700, ages 6-96) 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 norm group had people without known attention, learning, neurological, or psychological problems.

Many different ethnic groups from a variety of geographical areas were included in the normative sample (Not specified in manual).
IVA designed to maximize poor response inhibition

- Barkley: primary characteristic of ADHD is a deficit in response inhibition

- IVA-2 was designed to maximize errors of response inhibition.

- Prudence scale measures errors of commission for trials that specifically “pull for” an incorrect response (hit a 2).

- Comprehension Scales measures idiopathic errors of commission & omission, most sensitive measure of ADHD.

- Prudence & Comprehension identify response inhibition problems
Cognitive flexibility

- Schizophrenics, brain damaged pts: significant slowing in reaction time to cross-modal visual and auditory stimuli during high speed performance tasks; ability to shift sets impaired.

- Poor scores on Speed, Consistency, or Focus (discriminatory reaction time) = poor cognitive flexibility
Attention: 5 elements (Sohlberg & Mateer, 1987)

- **Focused attention** (hit the 1): Vigilance & Prudence
- **Sustained attention** (variability of RT): Stamina, Consistency, Focus, Aud & Vis Sustained Attention
- **Selective attention** (cognitive set): Prudence, Vigilance, Comprehension
- **Alternating attention** (cognitive flexibility): Speed, Consistency, Focus
- **Divided Attention**: relative differences in Prudence & Speed
KP purchased the Deluxe Kit, 3 year license per station, unlimited test administrations, but pay-per-use test reports.
10 Data Analyses

1. **Standard Scale**: quick overview of data
2. **Mental Concentration**: global measure of attentional functioning
3. **Malingering**: but note that extreme scores may not be malingering
4. **Sustained Attention**: attention under low demand & when S switch demand
5. **Comparative**: compare 2 separate testings, for med response, etc.
6. **High/Low**: compares performance under high and low demand conditions
7. **Sensory Modality**: side by side comparison of visual & auditory modalities
8. **Quintile Response**: track performance & stamina on each quintile
9. **Total Response**: all 500 responses
10. **Response Time Distribution** - Histogram; graphic of Consistency & Focus
1 **Diagnostic**: a draft preliminary diagnostic report

2 **Standard**: Provides the essential information needed to help guide the clinician in formulating a working diagnosis. It reviews the test validity & gives overview of the Global IVA-2 scales, descriptions of the different IVA-2 scales, what each scale measures, and what types of response errors.

3 **Detailed**: More detailed than Standard report

4 **Comprehensive**: The longest and most detailed report available. Contains all in above reports. *(Good way to train yourself on IVA interpretation)*

5 **Sustained Attention**: Identifies an individual’s ability to maintain his attention under low demand conditions and to stay on task when environmental distractors occur.
6 **Comparative**: Compares data from any two test administrations for the purpose of medication titration, evaluating treatment interventions, or identifying changes due to concussions or brain injuries.

7 **High/Low Demand**: Compares the test-taker’s performance under high & low demand conditions.

8 **Sensory Modality**: Compares auditory and visual processing abilities to help identify appropriate interventions or accommodations.

9 **Rating Scale**: Dx based solely on rating scales; description of the ADHD sx's; summary of the ADHD rating scale data collected.
Home menu screen
Home menu options

- **Getting Started**: overview documents
- **Add Person**: set up new record, then can do test
- **Administer Test**: select testee; then data entry screen
- **Reports & Data Analysis**: test results; 6 reports & analyses
- **ADHD Rating Scales**: rating scale data for each test record
- **Database Management**: which database to access
- **Edit Test Records**: modify records
- **Registration**: renew test license, purchase tests
- **System Options**: volume, startup music, language controls, password, can de-identify data
- **Researcher’s Tool Kit**: data analysis tool to export scores in spreadsheet format
- **Help**: manual and documents
- **Exit**
Administer Test

Meds on board?
List them
Before age 12 sxs
Include ?aires

Print Rating Scale
Start Test button
Once you have administered a test, you can choose to incorporate the IVA-2’s built-in rating scales. To begin, click the “ADHD Rating Scales” button in the main menu. Can use other scales.

There are a total of 36 questions in the questionnaire.

As an alternative, you can choose to print a hard copy of the rating scale questionnaire for the person to complete offline. You then have to input each answer.

Select patient administration

Once you receive the email stating that the questionnaire has been completed, you can return to the rating scales screen for that specific test session and click the “Download” button next to the scale you originally selected. This will transfer and score the rating scale data automatically. Once this is done, click “Save” at the bottom of the window.

Once you have downloaded the completed questionnaires, you can generate a report that incorporates the results.

The IVA-2 includes four separate reports that utilize the rating scales data: the Detailed Report, the Comprehensive Report, the Standard Report, and the Rating Scale Report.
ADHD Rating Scales: There are four for parents (can be completed by mother, father, stepmother, stepfather, grandmother, grandfather, or guardian), four for teachers, and one for clients (older than 18). Activate rating scale you want. Can Print it and then enter answers.
Reports & Data Analyses
You will be guided step-by-step through the Diagnostic Report Questionnaire. Questions pertaining to the client's symptoms and behaviors will be asked, as well as relevant factors, and treatment approaches. You will also be given the opportunity to include any recommendations you wish to make.
Diagnostic Report Questions: 6 ADHD sxs

Select up to 6 ADHD symptoms or behaviors that this individual presents with.

- None identified
- Conflicts on the job
- Conflicts with family
- Difficulty staying organized
- Difficulty sustaining attention
- Disorganized thinking
- Hostility/Irritability
- Impulsive behavior
- Interrupts others
- Low frustration tolerance
- Low self-esteem

Remind me to clarify this individual’s presenting concerns.

The examiner is not required to adhere to this specific diagnostic criteria and will be provided the opportunity to make the diagnosis of ADHD later in this questionnaire.
Example of Diagnostic Report Question

Are this individual's ADHD symptoms solely due to one or more of these causal factors:

1) Inability to understand instructions
2) Oppositional behavior
3) Defiant behavior
4) Hostility

[ ] Yes  [ ] No
Treatment recommendation questions
Can incorporate rating scale

<table>
<thead>
<tr>
<th>Rating Scale Type</th>
<th>Inattentive</th>
<th>Hyp/Imp</th>
<th>Score Type</th>
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<tbody>
<tr>
<td>First Teacher</td>
<td>6</td>
<td>5</td>
<td>Symptoms</td>
</tr>
</tbody>
</table>

Partial remission is defined as ADHD symptoms that occur below the diagnostic cutoffs yet still impair functioning. It also requires that this subclinical level of symptoms has persisted for the last six months and she must have been previously diagnosed with ADHD.

Was this individual previously diagnosed as having ADHD?  
- [ ] Yes  
- [ ] No

Based on your clinical judgment, is she in partial remission?  
- [ ] Yes  
- [ ] No

Remind me to clarify previous ADHD diagnosis.
It suggests a working ADHD diagnosis based on prior responses.
Diagnostic Report will be generated automatically and opened in IVA-2's built-in Word-compatible editor; can save as doc file to incorporate in your clinical report.
Before starting test

- Won’t start until you hit “W” to start Warm UP
- Instruct them to use the mouse & press left button (both right and left handers); only 1 click at a time & use only index finger. Don’t hold button down. Computer warns them if double click or holding down button.
- Instructor prompts appear on bottom of screen
- Can pause practice by hitting space bar
- Test takes about 13 minutes.
- At end of test, must enter system password to exit.
Rules out loud

- Ask them to state the rules out loud
- If unable to verbalize rules, can ask 4 questions:
  - What should you do when you see a one?
  - What should you do when you hear a one?
  - What are you supposed to do when you see a two?
  - What are you supposed to do when you hear a two?
- Don’t correct person who clicks impulsively and inappropriately when verbal instructions are being given. (Computer counts all of these secretly)
- During the test, do not correct or redirect ADHD behaviors.
IVA do’s

- USB mouse required
- Check for need for bathroom use before beginning test
- 15-24 inches in front of screen
- Headphones (preferred), speakers OK
- Adjust volume before starting
- Re-position the index finger or hand on mouse if necessary
IVA do’s

- No ADHD medications before test
- Any help allowed during practice (no data storage)
- Press spacebar during Practice session if “oops” happens 3 times. Review / ask what rules are.
- “Keep working, do your best”: only response allowed. No help or coaching during the test.
- Remove keyboard during actual test.
- Ctrl-F1 ends test
IVA don’ts

- No parents in room; tester must be in room
- Don’t allow subject to press down right mouse button
- Don’t allow hand switching of mouse
- Don’t correct if clicking during instructions
- Don’t correct or redirect distracted, off-task, restless behavior or talking during test.
- HIPAA compliance: passwords, names access
Behavioral Rating Scale: 12 items

- 1-7 rating (each time behavior occurs; 0 if no occurrence; if behavior lasts for 30 sec, counts as 2)

1. During the warmup, clicked the mouse during instructions
2. During the practice test, showed difficulty comprehending instructions. (3 oops stop counts as 1)
3. Talked, hummed, or made sounds to themselves during test
4. Played with or picked up the mouse.
5. Any switching of the hand or finger used to click the mouse.
6. Became angry, cursed, yelled or showed frustration. (Does not count as #3)
7. Wiggle, fidgeted or was restless. (Adjusting chair or less than 5 sec behaviors don’t count)

8. Talked about unrelated topics to the examiner (angry verbal outburst to a mistake or talking to self does not count)

9. Looked around the room (any glance away from screen, except #8 & 10))

10. Asked to stop the test or asked when the test would be done

11. Became drowsy, sleepy, eyes closed or head drooped for 5 sec or longer..

12. Stopped responding to test stimuli for 15 seconds or more.
Self-Report Questionnaire

Test taker reads 4 questions. 4 answers:

1 – Not at all
2 – Some
3 – A Lot
4 – Vey Much

No right or wrong answer. Be honest and accurate.
Health Screening Questionnaire

- Either by adult or parent of a child
- Questions: doctor for brain injury, for seizures or epilepsy, counselor for psychological problems, prescribed meds for ADHD, taking any prescribed meds currently, trouble reading, trouble with math, is hyperactive, believe has ADHD, diagnosed as having ADHD
IVA-2 includes four stages:

- **Warm-Up period**: 1 minute visual only and 1 minute auditory of “1”s; sensory/motor test of simple RT; 10 items in each minute; only 3 fastest RT scores used to compute quotient scores on warm up & cool-down.

- **Practice period**: 32 targets & foils, 90 seconds, “click if you see or hear a 1, don’t click for 2”; make test more reliable & and make sure they understand test.

- Whenever wrong response, hear & see, an “oops”; error= not click to a 1, error of omission; or clicking a 2, an error of commission; no scores recorded; stops if 3 oops; ask them to state rules (what should you do if you hear a 1, see a 1, hear a 2, see a 2.); can give as much help as needed during practice; hit spacebar to resume.

- Must always do Warm-Up and Practice if you use IVA.
Main Test

- 13 minutes for main section of test

- Visual targets: only 1.4% reduction in motor speed between first and second half of test on Stamina scale.

- Auditory targets: 4.1% reduction

- Norman individuals are able to sustain their response effort.
Test Stages 2

- **Main Test**: visual and auditory targets & foils, for ~12 minutes; start by hitting T; all clicks and RT (accurate to +/- 10 ms) are recorded
  - 5 sets of 100 trials; can interrupt with Ctrl-F1, but not pause
  - “Keep working, do your best” only verbalization allowed

- **Cool-Down period**: (same as Warm-Up) starts by pressing “C”; measures reaction time after the test; comparison to Warm-Up produces Persistence scale; determine if outside of normal RT
More unpredictable a CPT test pattern is, greater its sensitivity in identifying ADHD

500 trials: (5x 100 trials);
- 2 blocks of 50 trials each;
- trial = 1.56 sec.; visual= 167 ms, auditory = 500 ms;
- “1”= target, “2” = foil;

Groups of trials set up to pull response expectancy & to set shift:
- 1\textsuperscript{st} “high demand” block (pulls for impulsivity): Prudence scale collected
- 2\textsuperscript{nd} “low demand” block (pulls for inattention): Vigilance scale collected
1st “high demand” block: measure impulsivity, response control

- 50 trials of continuous responding,
- mostly targets (lots of “1”s), with 8 rare non-target foil “2”s (16% of total),

Frequent block

Measures ability to put on brakes (impulsivity);

The individual must suddenly inhibit their response demonstrating “Prudence” (response control, carefulness).
Low demand block: time for mind to wander

- 2nd “low demand” block: assess inattention
- Pulls for inattention, mind wandering
  - 50 trials, lots of “2”s, rare “1”s (16%, every 6 or 9 seconds)
  - Rare block
  - Measures ability to stay on task
  - This low demand block can produce idiopathic errors of commission (hit foil without a response set); loads on Comprehension scale
- Vigilance scale collected
- **Normal = 9% slower during rare blocks;**
- 16% non-targets per block
- variability in response time is measured
Test Scales

- IVA-2 scored divided into 3 categories: Attention, Response Control, & Symptomatic

- Primary diagnostic Scales: Full Scale Response Control & Full Scale Attention Quotients, both divided into auditory and visual modalities

- All scales phrased in positive terms, reported as raw scores & as quotient scores, like IQ scores; high numbers reflect good performance

- Q scores are $100 +/- 15$ s.d., age & gender matched means
7 error types

7 types of errors; all 500 trials classified by error type if incorrect response made; all of these types of errors found more frequently in people with self control or attention problems.

Not all impulsive errors are alike; Prudence, Vigilance, & Comprehension are defined on basis of 2 to 3 different error types each.
Basic Interpretation

- 1st check Validity Scales and Comprehension on Standard Scale Analysis

- Validity Scales: idiopathic errors (random responses; probability of < 1 in 1000); can interpret valid scales, if 1 validity is invalid and other is not; can run in auditory or visual only, if set shifting is suspected

- 2nd, review Global scales (FRCQ and FAQ are not means/averages of 2 subscales)

- Mean of 100, s.d. 15
Validity Check Scales: Random Responding

- **Auditory Response Validity Check**: measures auditory idiopathic errors, random responding

- **Visual Response Validity Check**: visual random responding

- Valid or @@ = invalid subscale

- Check Malingering Analysis Sheet
Provides a graphical readout of the Consistency and Focus scales (highly correlated): variability of RT.

Red line = mean RT of norm group

**Consistency**: reliable over time; variability of RT, ignoring outliers

**Focus**: variability of RT, but sensitive to outliers; variability of atypical performance; low = brief loss of attention; high = reliable
Spread of RT:

RT consistency = tightly grouped histogram, skyscraper

RT inconsistency = Town pattern: lots of far right spread, or widely dispersed responses
Standard Scale Analysis = Full scale & primary scales

**FRCQ & FSAQ:**

*Equal weight, not average, method:*

*If weighted scores are low, an even lower global score is possible*

Full Scales are considered most important
Full Scale Attention Quotient (FSAQ):

- Full Scale Attention Quotient (FSAQ): most important quotients
  - Auditory (AAQ)
  - Visual (VAQ)

- Are these scores at or below 85? If so, impaired.
### Attention and Response Control: Primary scales

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<th>ATTNENTION</th>
<th>Visual</th>
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<td>Quotient</td>
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<tr>
<td>100.0%</td>
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<td>Vigilance</td>
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<tr>
<td>72.0%</td>
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<table>
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<th>Visual</th>
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<tr>
<td>75.7%</td>
<td>80</td>
<td>Consistency</td>
</tr>
<tr>
<td>103.1%</td>
<td>110</td>
<td>Stamina</td>
</tr>
</tbody>
</table>

**Attention:**
- Vigilance
- Focus
- Speed

**Response Control:**
- Prudence
- Consistency
- Stamina

**Independent scales:** mostly uncorrelated scales
Primary Attention Scales: Vigilance (inattention)

- **Vigilance**: measure of attention: errors of omission; inattention errors (Fails to hit “1”); or set shifting errors; combination of Acuity & Elasticity

- 2 different types of errors of omission:
  - **Inattention** error of omission – failure to respond to a 1 when inhibition set established; miss a 1 in a lot of 2s (low demand) or for 1st two 1s under high demand at start of test immediately following low demand
  - **Propensity** error of omission - failure to click on a 1 after a 2 in high demand; set shifting difficulty

- Fewer auditory omission errors (15 point diff. is norm) (hearing always on)
- **Low score** = poor discriminative attention, poor staying on task; if < 80, difficulty staying alert, highway hypnosis, motivation down
- **High score** = attentive
Primary Attention Scales: **Focus** (drifting off, distracted)

- **Focus**: total variability of RT speed for correct responses; sensitive to outliers in RT, momentary *drifting off, loss of attention*; sensitive to slow RT; normal is less variable RT

- Correct response, but very slowly

- Focus is strongly correlated with **Consistency**
  - low score = unreliable (far right on RT distribution histogram)
  - high score = steady attention, tunes out distracters;
  - High correlation with Consistency, but more influenced by outliers
  - If **Focus 15 > Consistency** = relatively dependable, with occasional drift
  - Normal by age 19, declines 66+
Primary Attention Scales: **Speed** (processing speed)

- **Speed**: average RT of all correct responses; slowness; related to PIQ;
  - Normals: 2.8% decline in motor speed on visual; 6.2% decline on auditory
  - **low score** = attention problem due to slow RT, processing speed;
  - **high score** = rapid RT speed
  - Sensitive to depression or low processing speed
  - Pattern: fast & impulsive (Speed >120, Prudence <80)
  - Very high reliability (innate processing speed?)
Full Scale Response Control Quotient: Response Inhibition

- Full Scale Response Control Quotient:
  - Auditory (ARCQ)
  - Visual (VRCQ)

- Are these scores 85 or lower?
- Score of 85 or lower considered impaired.
- Poor Response Control: cognitive, behavior hyperactive
Primary Response Control Scales: Prudence (impulsivity)

- **Auditory (ARCQ) & Visual (VRCQ):**
  - **Prudence**: impulsivity & poor response inhibition; impulsive errors of commission (hit 2)

- **3 types of errors of commission:**
  - **Impulsivity** error: Hit 2 in high demand block; no braking
  - **Propensity** error: response to 2\textsuperscript{nd} 2 at beginning of low demand block
  - **Mode shift** error in low demand: response to auditory 2 after 2 visual 2s or to a visual 2 after 2 auditory 2s

- Low score = impulsivity, poor inhibition or careless, overreacting
- High score = response inhibition, careful, not automatically react

- Age = prudence improves with age
- Sex = males faster RT, more impulsive; by age 14, equal
**Consistency**: ability to sustain a reliable effort; reliability & variability of reaction time to correct responses over time, staying on task and sustain reliable effort; general variability of response time to correct responses.

- Young kids very poor consistency, Improves to age 45, then declines.
- Visual RT more variable than auditory in normals.
- **See Histogram**
- Low score = low sustained attention, unreliable, distractible.
- High score = good sustained attention, stays on task, inhibits distracters.
Primary Response Control Scales: **Stamina** (fatigue over time)

- **Stamina**: maintaining speed, sustained attention & effort (difference in RT of correct responses between first and last 100 trials)
  - 6% decrease (4% decrease in auditory & 1.4% for visual) in RT if normal
  - **low score** = difficulty maintaining processing speed, fatigue, lack of effort
  - **Good score** = good attentional endurance
  - **Possible malingering**
  - **Scale has low statistical reliability**
Fine Motor Regulation (Hyperactivity) Scale

- Measures **hyperactivity via off-task behavior with mouse** (multiple clicks to targets, clicks during instruction, anticipatory clicks, random clicks, holding down mouse button), playing with mouse

- Quantifies fidgetiness & restlessness associated with small motor hyperactivity

- Graphic bar: WNL/100 to extreme/60

- Double clicking is most common hyperactive behavior

- Low score = motoric problems with self control (but not gross motor or out of seat)

- OK by 14; increase 55+

<table>
<thead>
<tr>
<th>Fine Motor Hyperactivity</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperactive Events: 1</td>
<td>108</td>
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<td></td>
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</tbody>
</table>
Symptomatic Scales

<table>
<thead>
<tr>
<th>Symptomatic</th>
<th>Raw</th>
<th>Quotient</th>
<th>WNL</th>
<th>Mild</th>
<th>Mod</th>
<th>Sev</th>
<th>Ext</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehension (A)</td>
<td>100.0%</td>
<td>106</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comprehension (V)</td>
<td>100.0%</td>
<td>101</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Persistence (A)</td>
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<td>92</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Persistence (V)</td>
<td>99.7%</td>
<td>104</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensory/Motor (A)</td>
<td>218 ms</td>
<td>119</td>
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<tr>
<td>Sensory/Motor (V)</td>
<td>213 ms</td>
<td>106</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Symptomatic:
- Comprehension: Most important scale
- Persistence
- Sensory/Motor

No more Balance or Readiness Scales
Symptomatic Scales: Comprehension (random responding)

- **Comprehension:**
  - most important validity scale, the best single scale predictor of ADHD
  - Measures random responding via idiopathic errors of commission/omission (no reason to click; inappropriate clicking or failure to click)
  - Comprised of Steadiness & Reliability
  - Very rare in normal adults; they rarely make many idiopathic errors of commission/omission; normals are 98% accurate
  - **Bar:** WNL (>95) to Extreme (<65)
  - Very high (<60% correct, Extreme score) scores on both invalidates test, indicating random responding
  - scores of Mild, Moderate, Severe indicate ADHD
  - scores of 80+ tends to rule out ADHD
Symptomatic Scales: **Persistence (motivation)**

**Persistence:**

- Measure of motivation, when asked to do “one more thing”; or motor or mental fatigue
- Comparison of simple RT before and after Test section
- Processing speed; presence or absence of motivation, oppositionality, mental processing or motor fatigue
- **Bar:** WNL (>85) to Extreme (<60)
- **If Comprehension poor, and OK Persistence, trying their best**
- **Low Persistence does not invalidate test; low score = 60 or less; Only interpret if severe or extreme score**
- **Low statistical reliability**
Symptomatic Scales: Sensory/Motor (slow RT)

- **Sensory/Motor Scale:**
  - Gross motor speed: RT during Warm Up & Cool Down; screen for slow RT
  - Can indicate slow RT; slow RT influences Speed and global Attention Q scores;
  - Low score (Severe, Extreme) may indicate psychiatric (depression, dysthymia), Learning Disability, neurological possibility
  - If slow, Speed scale will be low
  - Only interpret if severe
Sustained Attention Scales

- Person’s ability to respond accurately, quickly, and reliably to auditory and visual stimuli under low demand conditions.

- In addition, these scales assess the test-taker’s ability to remain attentive and be flexible when the conditions change from low to high demand.
Sustained Attention Scales **: When things are slow

**Sustained Attention Scales**: ability to respond accurately under low demand conditions and ability to sustain attention & be flexible under high demand conditions when stimuli change.

Global scale: **Sustained Attention**: (impaired-superior); auditory & visual scales

Two global scales:

- **Competence**: measure of functioning under high demand; consists of Steadiness, Stability, Quickness
- **Maintainability**: functioning under low demand; consists of Reliability, Dependability, Swiftness

Each of these two global scales is comprised of six primary scales 😕: * = 6 are on SA Analysis
Sustained Attention Scales **: Competence - when need to pay attention is high

- **Competence (high demand)**: Keeping up the pace
- **Quickness**: response times when targets are frequent; ability to “keep up the pace” under high demand
- **Steadiness**: (faltering–steady) accuracy in clicking under high demand; idiopathic errors of omission (Propensity errors not included); low score = negligent, indifferent, WM impaired, confusion
- **Stability**: variability of RT under high demand; if low score, “erratic”; high, “very focused”
- **Elasticity**: (inelastic–flexible) (number of errors of omission when a 1 presented immediately after a 2 in high demand block; flexibility under changing conditions; difficulty getting back on track; subset of Vigilance.)
Sustained Attention Scales **: when overall demand to pay attention is low

- **Maintainability (low demand):** tendency to tune out, drift off
  
  - **Dependability*:** (inconstant-resolute) variability of RT to targets (1s) under **low demand**; responding in a similar fashion; low score = internal or external distractions

- **Reliability*:** (careless-reliable) idiopathic errors of commission; errors of hitting 2 when they are frequent – **low demand** (excludes all 3 types of commission errors loading on Prudence); high score = “reliable”

- **Swiftness*:** (slack-swift) RT under **low demand**; promptness, ability to come to attention under low demand; low score = slow processing speed, tardy

- **((Acuity*:** (unobservant-sharp) errors of omission of 1s under **low demand**; subset of Vigilance, but no propensity errors of omission; sensitive in adults who rarely make these errors)); low score = drift off, loss focus if constant demands not placed on them or under stressful or boring conditions

- Each of 6 scales is analyzed in the report for both auditory and visual deficits, with recommendations for each.

- All these scales are used in Sustained Attention & High/Low Demand Analyses
Analysis 4: Sustained Attention Analysis

Provides a global measure of a person's ability to respond to stimuli under low demand conditions accurately, quickly, and reliably.

In addition, it includes an assessment of the ability to sustain attention and be flexible under high demand conditions when stimuli change.

<table>
<thead>
<tr>
<th>Auditory Response Validity Check: Valid</th>
<th>Visual Response Validity Check: Valid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quotient Scores</td>
<td>Combined</td>
</tr>
<tr>
<td>SUSTAINED ATTENTION (Impaired - Superior)</td>
<td>88</td>
</tr>
<tr>
<td>Acuity (Unobservant - Sharp)</td>
<td>77</td>
</tr>
<tr>
<td>Dependability (Inconstant - Resolute)</td>
<td>121</td>
</tr>
<tr>
<td>Elasticity (Inelastic - Flexible)</td>
<td>0</td>
</tr>
<tr>
<td>Reliability (Careless - Reliable)</td>
<td>102</td>
</tr>
<tr>
<td>Steadiness (Faltering - Steady)</td>
<td>105</td>
</tr>
<tr>
<td>Swiftness (Slack - Swift)</td>
<td>121</td>
</tr>
</tbody>
</table>

The global scales are displayed in all caps and are based on the combined quotient scores of respective individual scales. Thus, no raw data exists for them.

Note: Quotient scores which are between 0 and 59 reflect extreme deficits.

Quotient scores between 0 to 59 are extreme deficits
Identifies an individual’s ability to maintain his attention under low demand conditions and to stay on task when environmental distractors occur.

**Sustained Attention Scales** reviewed: Each of these two global scales is comprised of six primary scales:

- Acuity,
- Dependability,
- Elasticity,
- Reliability,
- Steadiness,
- Swiftness.
Analysis 6: High/Low Demand Analysis: better or worse under what sensory modality

Comprised of two global scales, Competence and Maintainability.

**Competence** is a measure of functioning under high demand conditions and consists of the three scales Quickness, Steadiness, and Stability.

**Maintainability** measures of functioning under low demand conditions and is comprised of Dependability, Reliability, and Swiftness scales.

**Significance**: based on Quotient Score point differences:
- Major = 28+
- Moderate = 19-27
- Mild = 11-18
- Slight = 8-0
IVA-2 Competence (High Demand) and Maintainability (Low Demand)

The global Competence combined scale which assesses overall performance under High Demand conditions did differ significantly from the Maintainability scale that measures his overall performance under Low Demand conditions. He showed a slight improvement in functioning when the targets were presented less frequently. This finding suggests that he may perform better when the pace required to accurately process information is slower. His Competence auditory scale score was significantly different from the Maintainability auditory scale. A moderate improvement in his auditory functioning was found under Low Demand conditions. This finding indicates that he is likely to perform and attend better in response to auditory stimuli when the pace required to accurately process information is slower. The Competence visual scale score for this person was not found to significantly differ from his Maintainability visual scale.

IVA-2 Quickness (High Demand) and Swiftness (Low Demand)

The global Quickness scale which measures response times when the targets are frequent did not significantly differ from the Swiftness scale that measures his response times when the targets are infrequent and demand to respond is low. His Quickness auditory scale score was not significantly different from the Swiftness auditory scale. His Quickness visual scale score was not significantly different from the Swiftness visual scale.

IVA-2 Steadiness (High Demand) and Reliability (Low Demand)

The global Steadiness and Reliability scales did not reflect any significant differences in functioning under low or high demand conditions. In examining the Steadiness and Reliability auditory scales, a significant slight difference was identified. The individual made fewer idiosyncratic errors to auditory stimuli when the demand to perform was high as measured by the relatively higher Steadiness scale score. The visual Steadiness and Reliability scales did not reflect any significant differences in functioning under low or high demand conditions.

IVA-2 Stability (High Demand) and Dependability (Low Demand)

His Stability global scale differed significantly from the Dependability global scale reflecting a difference in the variability of response time to targets for high demand in comparison to low demand conditions. He was significantly less variable in his response times to targets under high demand to a major degree as reflected in the higher global Dependability scale score in comparison to the Stability scale. The auditory Dependability scale differed from the auditory Stability scale. The difference was moderate. When the auditory targets were less frequent, he was less variable in his responses to them. The visual Dependability and Stability scales differed significantly to a moderate degree. When the demand to perform was low, he was less variable in his responses to visual targets.

Compares the test-taker’s performance under engaging, high demand conditions (Competence) with his performance under low demand, more boring conditions (Maintainability).

Under which do they perform better: perform better with faster or slower presentations

Compares:
Quickness vs Swiftness
Steadiness vs Reliability
Stability vs Dependability
**Mental Concentration Analysis**: 1 Primary, 4 scales

- **Mental Concentration**: global measure of attentional functioning; consists of 2 global scales (auditory & visual); each 14 scales; if scale scores are high or low, global scale will be higher or lower than mean of all scales

- Only use if 15 point difference (1 s.d.) between standard scores; rated as Impaired-Superior; Quotient scores between 0 to 59 are extreme deficits

- **Self-Control**: combination of Prudence, Reliability, Stamina

- **Presence**: combination of Acuity, Elasticity, Steadiness, Vigilance

- **Resilience**: global measure of variability of responding; combination of Consistency, Dependability, Focus, Stability

- **Agility**: global measure of processing speed; combination of Quickness, Speed, Swiftness
Mental Concentration 2: Errors of omission

- **Self-Control**: ability to stop and not automatically react to a foil & sustain attention over time; combination of Prudence, Reliability, Stamina
  - Prudence: impulsive-prudent
  - Reliability: careless-reliable
  - Stamina: fatigued-enduring

- **Acuity**: errors of omission of 1s under low demand; subset of Vigilance, but no propensity errors of omission)

- **Steadiness**: accuracy in clicking under high demand; idiopathic errors of omission (Propensity errors not included)

- **Presence**: different types of errors of omission; combination of Acuity, Elasticity, Steadiness, Vigilance
  - Acuity: unobservant-sharp
  - Elasticity: inelastic- flexible
  - Steadiness: faltering-steady
  - Vigilance: neglectful-vigilant
Mental Concentration 3

- **Resilience**: global measure of *variability of responding times to targets*; combination of Consistency, Dependability, Focus, Stability
  - Consistency: uneven-consistent
  - Dependability: inconstant-resolute
  - Focus: dispersed-focused
  - Stability: erratic - stable

- **Agility**: global measure of *processing speed*; combination of Quickness, Speed, Swiftness
  - Quickness: slow-quick
  - Speed: sluggish-fast
  - Swiftness: slack-swift
Mental Concentration Analysis 4

- **Accuracy**: (inaccurate-precise)
  - A global measure of accuracy of responding; number of times a “true” correct response is made (click a 1 one time under both high and low demand conditions & not clicking to any 2s); very stable scale; high score = “precise”; can look at both auditory vs. visual

- **Fine Motor Hyperactivity**: (fidgety-controlled)
Processing speed scales: Quickness & Swiftness

- **Quickness**: response times under **high demand** (targets are frequent); ability to "keep up the pace" under high demand

- **Swiftness**: RT under **low demand**; ability to **come to attention** under low demand; low score = slow processing speed, tardy

- **Compare the two**: do they respond slower under high or low demand

- **Low Swiftness** = “tardy”, slow processing speed under low demand; high Swiftness = impulsive, but quick; more careless errors

- **Low Quickness** = can’t keep up the pace

- Can respond slowly under both demand conditions: poor processing speed
There are four global scales which comprise the MENTAL CONCENTRATION analysis.

These four global scales are: SELF-CONTROL, PRESENCE, RESILIENCE, AND AGILITY.

Each of these global scales is derived from individual visual and auditory component scales.
### IVA-2 Mental Concentration Analysis 2

<table>
<thead>
<tr>
<th>Quotient Scores</th>
<th>Combined</th>
<th>Auditory</th>
<th>Visual</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGILITY (Impaired - Superior)</td>
<td>123</td>
<td>131</td>
<td>110</td>
</tr>
<tr>
<td>Quickness (Slow - Quick)</td>
<td>122</td>
<td>129</td>
<td>111</td>
</tr>
<tr>
<td>Speed (Sluggish - Fast)</td>
<td>122</td>
<td>130</td>
<td>110</td>
</tr>
<tr>
<td>Swiftness (Slack - Swift)</td>
<td>121</td>
<td>130</td>
<td>107</td>
</tr>
<tr>
<td>Accuracy (Inaccurate - Precise)</td>
<td>100</td>
<td>109</td>
<td>91</td>
</tr>
<tr>
<td>Fine Motor Hyperactivity (Fidgety - Controlled)</td>
<td></td>
<td></td>
<td>108</td>
</tr>
</tbody>
</table>

The global scales are displayed in all caps and are based on the combined quotient scores of respective individual scales. Thus, no raw data exists for them.

Note: Quotient scores which are between 0 and 59 reflect extreme deficits.
<table>
<thead>
<tr>
<th>SELF-CONTROL SCALES</th>
<th>Auditory</th>
<th>Visual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prudence</td>
<td>98.7%</td>
<td>96.9%</td>
</tr>
<tr>
<td>Reliability</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Stamina</td>
<td>103.1%</td>
<td>106.5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PRESENCE SCALES</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Acuity</td>
<td>100.0%</td>
<td>96.0%</td>
</tr>
<tr>
<td>Elasticity</td>
<td>100.0%</td>
<td>95.0%</td>
</tr>
<tr>
<td>Steadiness</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Vigilance</td>
<td>100.0%</td>
<td>95.6%</td>
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<table>
<thead>
<tr>
<th>RESILIENCE SCALES</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Consistency</td>
<td>75.7%</td>
<td>87.9%</td>
</tr>
<tr>
<td>Dependability</td>
<td>87.6%</td>
<td>89.5%</td>
</tr>
<tr>
<td>Focus</td>
<td>72.0%</td>
<td>77.4%</td>
</tr>
<tr>
<td>Stability</td>
<td>69.7%</td>
<td>75.9%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AGILITY SCALES</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Quickness</td>
<td>463 ms</td>
<td>371 ms</td>
</tr>
<tr>
<td>Speed</td>
<td>470 ms</td>
<td>379 ms</td>
</tr>
<tr>
<td>Swiftness</td>
<td>493 ms</td>
<td>417 ms</td>
</tr>
</tbody>
</table>

| Accuracy              | 249      | 246    |
| Fine Motor Hyperactivity | Hyperactivity Events: 1 |
IHG & ATF: only defined in manual; not referenced in reports

- Determine whether **Impulsive/Hyperactive Factor (IHF)** is positive (+).
- IHF is positive when any valid Prudence, Reliability, or Fine Motor Hyperactivity scales have quotient less than 85. If none meet criterion, then IHF is negative.
- **Attention Factor (ATF)** must be determined.
- ATF is positive when any valid Vigilance or Steadiness scales have quotient score less than 85. If so, positive; if not, negative.
- These scales are in Mental Concentration Analysis
- Use the Report to do calculations.
Analysis 7: Sensory Modality Analysis **: Auditory vs Visual preference

<table>
<thead>
<tr>
<th>Quotient Scores</th>
<th>Auditory</th>
<th>Visual</th>
<th>Difference</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATTENTION QUOTIENT</td>
<td>102</td>
<td>67</td>
<td>35</td>
<td>Major</td>
</tr>
<tr>
<td>Vigilance</td>
<td>105</td>
<td>36</td>
<td>69</td>
<td>Major</td>
</tr>
<tr>
<td>Focus</td>
<td>70</td>
<td>89</td>
<td>-19</td>
<td>Moderate</td>
</tr>
<tr>
<td>Speed</td>
<td>130</td>
<td>110</td>
<td>20</td>
<td>Moderate</td>
</tr>
<tr>
<td>SUSTAINED ATTENTION</td>
<td>123</td>
<td>51</td>
<td>72</td>
<td>Major</td>
</tr>
<tr>
<td>Acuity</td>
<td>105</td>
<td>66</td>
<td>39</td>
<td>Major</td>
</tr>
<tr>
<td>Dependability</td>
<td>114</td>
<td>116</td>
<td>-2</td>
<td>--</td>
</tr>
<tr>
<td>Elasticity</td>
<td>104</td>
<td>0</td>
<td>104</td>
<td>Major</td>
</tr>
<tr>
<td>Reliability</td>
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<td>104</td>
<td>-4</td>
<td>--</td>
</tr>
<tr>
<td>Steadiness</td>
<td>109</td>
<td>100</td>
<td>9</td>
<td>Slight</td>
</tr>
<tr>
<td>Swiftness</td>
<td>130</td>
<td>107</td>
<td>23</td>
<td>Moderate</td>
</tr>
<tr>
<td>RESPONSE CONTROL QUOTIENT</td>
<td>97</td>
<td>122</td>
<td>-25</td>
<td>Moderate</td>
</tr>
<tr>
<td>Prudence</td>
<td>105</td>
<td>95</td>
<td>10</td>
<td>Slight</td>
</tr>
<tr>
<td>Consistency</td>
<td>80</td>
<td>133</td>
<td>-53</td>
<td>Major</td>
</tr>
<tr>
<td>Stamina</td>
<td>110</td>
<td>114</td>
<td>-4</td>
<td>--</td>
</tr>
</tbody>
</table>

Note: Definitions are based on Quotient Score point differences.

Slight = 8 - 10   Mild = 11 - 18   Moderate = 19 - 27   Major = 28+   N.S. = "--"
## Sensory Modality Analysis 2

<table>
<thead>
<tr>
<th>Mental Modality</th>
<th>Auditory</th>
<th>Visual</th>
<th>Difference</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>MENTAL CONCENTRATION</td>
<td>111</td>
<td>78</td>
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<td>Major</td>
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<tr>
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<tr>
<td>Prudence</td>
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</tr>
<tr>
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<td>-4</td>
<td>--</td>
</tr>
<tr>
<td>Stamina</td>
<td>110</td>
<td>114</td>
<td>-4</td>
<td>--</td>
</tr>
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<td>PRESENCE</td>
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<td>83</td>
<td>Major</td>
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<td>.19</td>
<td>Moderate</td>
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<td>.6</td>
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<tr>
<td>AGILITY</td>
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<td>Moderate</td>
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<td>18</td>
<td>Mild</td>
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<tr>
<td>Speed</td>
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<td>110</td>
<td>20</td>
<td>Moderate</td>
</tr>
<tr>
<td>Swiftness</td>
<td>130</td>
<td>107</td>
<td>23</td>
<td>Moderate</td>
</tr>
<tr>
<td>Accuracy</td>
<td>109</td>
<td>91</td>
<td>18</td>
<td>Mild</td>
</tr>
</tbody>
</table>

Note: Definitions are based on Quotient Score point differences.

Slight = 0 - 10  
Mild = 11 - 18  
Moderate = 19 - 27  
Major = 28+  
N.S. = "--"
### Sensory Modality 3

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<th>Difference</th>
<th>Significance</th>
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<td>105</td>
<td>95</td>
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<td>Slight</td>
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<tr>
<td>Quickness</td>
<td>129</td>
<td>111</td>
<td>18</td>
<td>Mild</td>
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<tr>
<td>Steadiness</td>
<td>109</td>
<td>100</td>
<td>9</td>
<td>Slight</td>
</tr>
<tr>
<td>Stability</td>
<td>90</td>
<td>96</td>
<td>-6</td>
<td>--</td>
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<th>Visual</th>
<th>Difference</th>
<th>Significance</th>
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</thead>
<tbody>
<tr>
<td><strong>MAINTAINABILITY (Low Demand)</strong></td>
<td>133</td>
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<td>38</td>
<td>Major</td>
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<tr>
<td>Acuity</td>
<td>105</td>
<td>66</td>
<td>39</td>
<td>Major</td>
</tr>
<tr>
<td>Dependability</td>
<td>114</td>
<td>116</td>
<td>-2</td>
<td>--</td>
</tr>
<tr>
<td>Reliability</td>
<td>100</td>
<td>104</td>
<td>-4</td>
<td>--</td>
</tr>
<tr>
<td>Swiftness</td>
<td>130</td>
<td>107</td>
<td>23</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

Note: Definitions are based on Quotient Score point differences.

- Slight = 8 - 10
- Mild = 11 - 18
- Moderate = 19 - 27
- Major = 28+
- N.S. = "--"
Flow Chart: Now built into reports; don’t need to calculate

- Use for diagnosis
- Step and rule approach
- Rule: find first match, then stop
- Check Validity first, then Full Scales
Flow Chart is a sequential, score based, way to arrive at diagnosis.

When both Validity valid & FRCQ & FAQ => 85:
- 1 – SAAQ < 80 & SVAQ < 80 = ADHD, Inattentive
- 2 – 2+ Primary scales &/or Comprehension &/or Fine Motor < 68 = ADHD, NOS
- 3 – None of above = No ADHD
Both Validity ok; & both FRCQ & FAQ less than 85:
1. Both FRCQ & FAQ < 85 = ADHD, Combined
2. If FRCQ or FAQ < 80 = ADHD, Comb.
3. Both FRCQ & FAQ < 85 & either Visual Comprehension &/or Auditory Comprehension < 85 = ADHD, Comb.
4. Both FRCQ & FAQ < 85, & Fine Motor < 85 = ADHD, Comb
5. If both FRCQ & FAQ < 85, & SAAQ &/or SVAQ < 80 = ADHD, Inatten
6. If both FRCQ & FAQ < 85 & 1 or more Primary < 68 = ADHD, NOS
7. None of above: no ADHD
Rest of Steps

- Step 3: Both valid & FRCQ < 85, but FAQ =>85
- Step 4: Both valid & FAQ < 85 & FRCQ => 85
- Step 5: Both valid & Both ARCQ & AAQ => 85
- Step 6: Both valid & either ARCQ &/or AAQ less than 85
- Step 7: Auditory valid ok, Visual invalid & ARCQ <85 & AAQ => 85
- Step 8: Auditory valid ok, Visual invalid & AAQ < 85 & ARCQ => 85
- Step 9: Visual valid ok, auditory valid invalid & VRCQ & VAQ =>85
- Step 10: Visual valid, auditory valid invalid & either VRCQ &/or VAQ <85
- Step 11: Visual valid & auditory valid invalid & VRCQ <85 & VAQ =>85
- Step 12: Visual valid ok, auditory valid invalid & VAQ <85 & VRCQ =>85
- Step 13: Both validities invalid
Issues

- **Test-Retest**: practice effect is low
- **Age**: 5-6 year olds can be unreliable; check Comprehension
- **IQ**: If PIQ of 120+, compare to older age group; or if PIQ < 80, with younger; just redo analysis, and input an older or younger birthdate
- **VAQ**: 3% improvement on retest reliability (due to Visual RT)
IVA:

- 92% sensitivity, 90% specificity;
- 7.7% false negative;
- Auditory and visual performance highly correlated in normals for 6 primary scales;
- Females significantly fewer commission errors (3%), and males had 23 ms faster mean RT for correct;
- RT slower for age 45+ and below 7
Patterns

- **RT histogram**: more like a skyscraper, better the performance, more normal; if many scores > 750ms, attention is problem

- ADHD: Fine Motor Regulation Score low (<80), Comprehension low in both modalities = hyperactivity

- FMRQ 80+, Comprehension: Inattention, set shifting problems without hyperactivity
Patterns

- **Non-ADD problem**: low Speed, Sensory/Motor

- **Slow starter**: Speed OK, Sensory/Motor down by 15 points: slow starter, OK in stretch

- **Off task**: Focus for a sensory modality significantly less than Consistency, esp. if Readiness for same modality <85 (on task is opposite)
ADHD Facts

- Classic ADHD combined: auditorily impulsive, visually inattentive
- ADHD combined boys: smaller R frontal
- 40% of men in prison have ADHD
- Adolescent ADHD: failure to yield is most frequent car ticket; don’t stop
- Schizophrenics: Auditory > Visual omission and commission errors, and sig. more commission errors than normals;
- Bipolars: Visual > Auditory omissions
- 54% of college students can fake ADHD on ratings
Diagnostic Patterns

- **Dx ADHD (Hyperactive):**
  - If FSRCQ is <80 and FAQ > 85

- **Dx ADHD, Inattentive type:**
  - If FSRCQ >85 and FAQ <80

- **Dx ADHD, Combined type:**
  - If FSRCQ and FAQ <80

- Conduct Disorder & Oppositional Defiant do OK on IVA
- Acute Psychosis will raise IVA
Cautions:

- Marijuana use affects IVA
- Effort affects IVA
Relative Strengths and Weaknesses

- **Strength/weaknesses:**
  - On/off-task behavior
  - Alertness/sluggishness
  - Quickness/slowness
  - Auditory/Visual

- **Speed:** for off-task, slow, or sluggish behavior

- **Preference for sensory modality:** compare Consistency & Focus scales for each sensory modality;
  - **off-task:** Focus < Consistency; Persistence (<80), as long as fatigue not present (Stamina <85)
  - **on-task** behavior (Focus > Consistency, Persistence (>120), Comprehension (>115)

- **Type of errors:** check Comprehension, Prudence, Vigilance

- **Need a difference of at least 8 quotient points**
Managing Test Records

- Can update all personal information at any time
- From Home Menu, go to Edit Test Records
- Can also delete a test record
- Can save records to multiple databases.
Test & ADHD questionnaire results can create **9 different interpretative reports**

Primarily based on data presented in **corresponding data analysis**

Remember to **check box** labeled Working Diagnosis & Rating Scale Data

Either Parent/Teacher **rating scales** or Self rating can be included in report, but not both. Can generate both.

For **graphic review of test results**, use **Standard Scale Analysis**

**Diagnostic Report is the most basic report**, but need to answer questions 1\(^{st}\).

**Comprehensive Report** is longest and most detailed.

Word Processor saves in either .docx, .rtf, or pdf file formats
Provides clinicians with a way to integrate an extensive amount of clinical data into a draft preliminary diagnostic report.

To prepare the report, the IVA-2 test requires that the clinician answer a series of relevant key questions necessary to confirming or refuting a diagnosis of ADHD.

Provides most basic conclusions about attention & response control, plus a diagnosis.
1. Primary presenting sxs
2. Whether ADHD sxs can be accounted for by other factors
3. Settings and circumstances of sxs
4. Whether functioning is impacted
5. How long sxs have been present
6. Behaviors observed during intake and testing
7. Clinical history of ADHD sxs
8. Family history of ADHD
9. Clinical assessment of test validity
10. Medications at time of testing
11. Recommended accommodations and treatment approaches
12. Factors that may contribute to individual’s impairment
Name: Public, John

Age: 31  Sex: M  Report Date: 11/7/2014  Test Date: 11/3/2014 03:10 PM  On Meds: N

He is a 31 year old male who presents with the primary symptoms of conflicts on the job, conflicts with family, and difficulty sustaining attention. Symptoms were noted as occurring in the school and home settings. I have determined that these symptoms clearly impair his functioning. Significant hyperactive/impulsive symptoms were observed during the clinical intake, but no significant ADHD-type symptoms were observed during the IVA-2 test administration. This individual's ADHD symptoms are not due to an inability to understand instructions. They are also not due solely to hostile or oppositional behavior.

This individual has not previously been diagnosed as having ADHD. His symptoms have persisted for a sufficient period of time to support a diagnosis of ADHD. ADHD symptoms were identified to be present when this individual was a child. One or more family members have been reported as being formally diagnosed with ADHD. This individual was not taking any medication at the time of testing that was likely to affect his test results.

The test results were fully valid, and this individual demonstrated sufficient motivation in completing this test. His IVA-2 test scores supported the possible working diagnoses of ADHD, Inattentive presentation, Mild Neurocognitive Disorder, and Other Mental Diagnosis. The IVA-2 test results identified impairments in attentional functioning. The rating scales results identified symptoms that supported a possible working diagnosis of ADHD, Combined presentation.

Taking all of the clinical data into account, my diagnosis for this individual is ADHD, Combined presentation, Moderate. In order to help him at this time, based on his diagnosis, I am making the following treatment recommendations: behavior therapy and cognitive training. I am recommending that the following reasonable accommodations be made to help this individual in academic settings: arrange more frequent meetings with the instructors, arrange quiet test conditions, and provide copies of power point lectures.
Analysis 1: Standard Scale Analysis

Used to obtain a quick overview of the data interpreted in the Standard Report.

It helps the examiner identify how an individual performed relative to norm (others’ of the same sex and age) group.
### Standard Scale analysis 2: Primary scores

#### Attention

<table>
<thead>
<tr>
<th>Auditory</th>
<th>ATTENTION</th>
<th>Visual</th>
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<tbody>
<tr>
<td>Raw</td>
<td>Quotient</td>
<td>Primary Scales</td>
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<tr>
<td>100.0%</td>
<td>105</td>
<td>Vigilance</td>
</tr>
<tr>
<td>72.0%</td>
<td>70</td>
<td>Focus</td>
</tr>
<tr>
<td>470 ms</td>
<td>130</td>
<td>Speed</td>
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#### Response Control

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<tr>
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<td>Primary Scales</td>
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<td>98.7%</td>
<td>105</td>
<td>Prudence</td>
</tr>
<tr>
<td>75.7%</td>
<td>80</td>
<td>Consistency</td>
</tr>
<tr>
<td>103.1%</td>
<td>110</td>
<td>Stamina</td>
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### Fine Motor Hyperactivity

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<th>WNL</th>
<th>Mild</th>
<th>Mod</th>
<th>Sev</th>
<th>Ext</th>
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<tr>
<td></td>
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<td>Fine Motor Hyperactivity: 108</td>
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<td>---------------------</td>
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<td>-----</td>
<td>------</td>
</tr>
<tr>
<td>Comprehension (A)</td>
<td>100.0%</td>
<td>106</td>
<td></td>
<td></td>
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<tr>
<td>Comprehension (V)</td>
<td>100.0%</td>
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<tr>
<td>Persistence (A)</td>
<td>89.4%</td>
<td>92</td>
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<tr>
<td>Sensory/Motor (A)</td>
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<td>119</td>
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<tr>
<td>Sensory/Motor (V)</td>
<td>213 ms</td>
<td>106</td>
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</table>

Test Version IVA-2 2014.1
Provides the essential information needed to help guide the clinician in formulating a *working diagnosis* for individuals who may have ADHD.

It reviews the test validity and provides an overview of the 6 Global IVA-2 scales, malingering as well as a working diagnosis.

Descriptions of the 6 different IVA-2 scales, what each scale measures, and what types of response errors will affect each scale score can be found in the section below titled Summary of IVA-2 Scales.
OVERVIEW OF THE IVA-2 CPT AND GENERAL INTERPRETIVE GUIDELINES

This IVA-2 Standard Report was created in order to help the examiner interpret the IVA-2 test results for diagnostic purposes. The Standard Report provides the essential information needed to help guide the clinician in formulating a working diagnosis for individuals who may have ADHD. The relevant strengths and weaknesses for each of the Attention and Response Control Primary Scales will be reviewed.

This report is designed to aid qualified healthcare professionals in formulating a working diagnosis for individuals who report ADHD-type symptoms. It is confidential and is only distributed for use in accordance with professional guidelines. The report provides possible suggestions and hypotheses for the examiner to consider, but it is not to be construed as prescriptive, definitive, or diagnostic. Only tentative "working" diagnoses are indicated by the test results and are by no means conclusive. Examiners will need to exercise their clinical judgment in determining if the test is fully valid and to integrate it with other clinical data in preparing their signed interpretive report. If in the examiner's judgment, these IVA-2 test results are incongruent with the individual's clinical history and other test data, it is recommended that less weight be given to these test results in making a diagnosis. The authors and publisher of this test are not responsible for any inaccuracies or errors that may result from its usage.
IVA-2 DIAGNOSTIC INTERPRETIVE GUIDELINES

MALINGERING EVALUATION

In respect to the IVA-2, malingering is defined as deliberately making test responses that feign impairments of attention or response control for personal gain. Published research has found that individuals who malinger on this test produce extreme quotient scale scores. Such intentionally impaired scores result from an excessive number of omission, commission, or idiopathic response errors. This pattern of response errors is rarely observed for individuals who have been diagnosed as having ADHD, unless they have severe to extreme ADHD symptoms or other significant cognitive deficits. Nevertheless, the determination of malingering requires that a clinical decision be made by the examiner. In most cases, additional tests of malingering will need to be administered in order to accurately identify its occurrence.

Neither the Visual nor the Auditory Malingering Indicators identified this individual as malingering on the IVA-2.

SUMMARY OF TEST RESULTS FOR THE IVA-2 GLOBAL SCALES
His Auditory Response Control quotient scale score was 97 (PR=42). This global scale score fell in the average range. The Visual Response Control quotient scale score for this individual was 122 (PR=93). This global scale score fell in the superior range.

His Auditory Attention quotient scale score was 102 (PR=54), and this global scale score fell in the average range. The Visual Attention quotient scale score for this individual was 67 (PR=1). This global scale score was classified as falling in the severely impaired range.

His global Auditory Sustained Attention quotient scale score was 123 (PR=93), and it fell in the superior range. The global Visual Sustained Attention quotient scale score for this individual was 51 (PR=1). This score was found to fall in the extremely impaired range.
IVA-2 WORKING DIAGNOSIS

These test findings support a working diagnosis of **Attention-Deficit/Hyperactivity Disorder**, predominantly inattentive presentation, and this individual's pattern of responding was indicative of impairments likely to impact his functioning in the home and work settings. However, it is necessary to determine the occurrence of several inattentive or hyperactive/impulsive symptoms before the age of twelve in order to diagnose ADHD for adolescents or adults. Since the examiner did not identify whether this individual had ADHD symptoms when he was a child, it is essential that the examiner clarify this individual's clinical history in order to make a definitive diagnosis. It will also be necessary that **Mild neurocognitive disorder** and other mental disorders be ruled out as possible underlying causes for this individual's ADHD symptoms.

His global Full Scale Attention quotient scale score indicated a mild impairment that supported this working diagnosis. Even though this individual's global Full Scale Response Control quotient scale score did not indicate a significant impairment in functioning, his global Sustained Visual Attention quotient scale score did reveal an extreme impairment. While a problem was identified for this individual in respect to his Sustained Visual Attention quotient scale score, his Sustained Auditory Attention quotient scale score was not found to be impaired and fell in the superior range. He was also not identified as making an excessive number of impulsive errors during the test. These IVA-2 findings provide support for the above working diagnosis.
Uses information from the IVA-2 test, available rating scale data, and information regarding the presence of ADHD-type symptoms before the age of twelve, if applicable, to help the examiner interpret the IVA-2 test results for diagnostic purposes.
SUMMARY OF TEST RESULTS FOR THE IVA-2 GLOBAL SCALES

This individual's overall global quotient scale score for the Full Scale Response Control scale was 112 (PR=79). This score fell in the above average range. His Auditory Response Control quotient scale score was 97 (PR=42). This global scale score fell in the average range. The Visual Response Control quotient scale score for this individual was 122 (PR=93). This global scale score fell in the superior range.

This individual's overall quotient score on the Full Scale Attention scale was 83 (PR=14). This global scale score fell in the mildly impaired range. His Auditory Attention quotient scale score was 102 (PR=54), and this global scale score fell in the average range. The Visual Attention quotient scale score for this individual was 67 (PR=1). This global scale score was classified as falling in the severely impaired range.

This individual's global quotient score on the Combined Sustained Attention scale was 88 (PR=21). This score fell in the slightly impaired range. His global Auditory Sustained Attention quotient scale score was 123 (PR=93), and it fell in the superior range. The global Visual Sustained Attention quotient scale score for this individual was 51 (PR=1). This score was found to fall in the extremely impaired range.

The identified strengths, weaknesses, and interrelationships of the Auditory and Visual Response Control and Attention scales are reported and discussed below. The specific scales that comprise the Auditory and Visual Sustained Attention scales and their meanings are discussed in the sections related to the Primary Response Control and Attention scales. Also, a discussion is included in the sections below for the three Symptomatic scales: Comprehension, Persistence, and Sensory/Motor.
IVA-2 Detailed Report: Vigilance, Focus, Speed

Vigilance is a Primary scale that measures general attentional ability. Deficits in Vigilance result from errors of omission that occur under both high and low demand conditions.

This person’s Auditory Vigilance quotient scale score was 105 (PR=62), which falls in the average range. This individual did not show any problems with his general auditory attentional functioning.

This person’s Visual Vigilance quotient scale score of 36 (PR=1) fell in the extremely impaired range. His general visual attentional functioning showed significant problems that are likely to have a major impact on his ability to perform successfully in many areas of his life.

Focus

This individual’s Auditory Focus quotient scale score of 70 (PR=2) fell in the moderately to severely impaired range. At times this individual showed difficulty due to delays and variability in his response time to auditory test stimuli. His pattern of responding indicated that his attention frequently “drifted off.” This problem may be due to deficits in auditory working memory or to difficulty in maintaining focus to auditory stimuli during the test.

This person’s Visual Focus quotient scale score of 69 (PR=24) fell in the slightly impaired range. Most of the time this individual is able to process and stay focused on visual stimuli. Infrequent lapses in visual response times were found. These lapses in visual processing may be due to slight fatigue or to a preoccupation with distracting thoughts.

Speed

This individual’s Auditory Speed quotient scale score of 130 (PR=98) falls in the exceptional range. This individual showed a strength in his overall auditory processing speed. His recognition reaction time falls within the exceptional range. His processing speed shows that he is exceptional with respect to his ability to perceive and respond to auditory stimuli.

He had an above average Visual Speed quotient scale score of 110 (PR=76). His recognition reaction time falls within the above average range. His processing speed shows that he is above average with respect to his ability to perceive and respond to visual stimuli. This represents a relative strength for him.
RESPONSE CONTROL PRIMARY SCALES

Prudence

Prudence is a measure of impulsivity as defined by errors of commission. It is an important measure of performance related to response control and a Primary scale.

This individual's Auditory Prudence quotient scale score of 105 (PR=62) fell in the average range. This individual was found to be functioning in the average range with respect to his ability to inhibit responses to non-target auditory stimuli.

This person's Visual Prudence quotient scale score of 95 (PR=38) fell in the average range. No problems with inhibition to non-target visual stimuli were identified. This individual demonstrated an average ability to control his responses and inhibit appropriately to non-target visual stimuli.

Consistency

The Consistency scale is a general measure of an individual's ability to respond reliably based on his reaction time. Consistency is an important Primary scale for understanding and evaluating response control.

This individual was mildly impaired in his ability to be consistent in his responses to auditory stimuli. His Auditory Consistency quotient scale score was 80 (PR=10). This individual will need to learn to ignore internal or external auditory distractions in order to improve his performance when sustained attention is required.

This individual's ability to be consistent in his responses to visual stimuli was exceptional. The Visual Consistency quotient scale score for this individual was 133 (PR=99). Even under distracting conditions or when stressed, this individual is likely to be consistent in his reaction time to visual stimuli. Working memory and the ability to sustain internal attention are indicated as areas of strength.
Stamina

The Stamina scale is a measure of the individual’s ability to sustain his speed of response time during the course of the test. This scale is a Primary scale and is an important measure of response control.

This individual’s Auditory Stamina quotient scale score of 110 (PR=76) fell in the above average range. This person’s response time to auditory stimuli became faster over the course of the test. He was able to increase his mental processing speed in the auditory domain during the test.

He had an above average Visual Stamina quotient scale score of 114 (PR=82). He was able to increase his mental processing speed in the visual domain during the test.

Fine Motor Hyperactivity

The Fine Motor Hyperactivity Quotient measures off-task, spurious, impulsive, and inappropriate fine motor activity using the mouse input device. Errors on this Primary scale are considered reflective of problems with fine motor self-control but do not reflect gross motor hyperactivity (i.e., "out of seat" behavior). A person who is squirmy, restless, or who doodles or fiddles with small objects may score low on this scale. These kinds of response tendencies may be described as fidgetiness and restlessness. Generally, high incidences of these behaviors are atypical, except for children age 13 and under and individuals over age 55. Quotient scores above the average range are considered reflective of better controlled and more self-regulated responses.

This person’s Fine Motor Hyperactivity quotient scale score was 108 (PR=69). His score fell in the average range.
**Comprehension**

The Comprehension scale is a measure of idiosyncratic errors both of commission and omission occurring under both low and high demand conditions. It is one of the three Symptomatic scales and is useful in identifying factors that may impact performance or possibly reflect the test-taker’s motivation toward taking and understanding the IVA-2 test.

This individual’s **Auditory Comprehension** quotient scale score of $106$ (PR=$68$) fell in the average range. No major problems with functioning and performing adequately on the IVA-2 test were found for the Auditory Comprehension scale. Overall, he performed well with respect to his ability to follow the test rules. He did not demonstrate any significant problems with respect to the Auditory Comprehension scale that would impact his life.

This individual’s **Visual Comprehension** quotient scale score of $101$ (PR=$54$) fell in the average range. His Visual Comprehension scale did not indicate any major problems. Overall, he performed well with respect to his ability to follow the test rules. No significant impacts in his life should be expected with respect to Visual Comprehension.

**Persistence**

This individual’s **Auditory Persistence** quotient scale score of $92$ (PR=$31$) fell in the average range. There was no significant difference in his auditory reaction time during the Cool-down as compared to the Warm-up. Thus, his quotient score on the Persistence scale did not indicate any problems with his motivation that would impair his functioning on the IVA-2 test.

This person’s **Visual Persistence** quotient scale score of $104$ (PR=$62$) fell in the average range. No significant difference was found in his visual reaction time during the Cool-down as compared to the Warm-up. Thus, his quotient score on the Persistence scale did not indicate any problems with his motivation that would impact his functioning on the IVA-2 test.
Sensory/Motor

This individual's Auditory Sensory/Motor quotient scale score of 119 (PR=90) fell in the above average range. This scale score was computed based on the mean of the three fastest reaction times of his auditory responses during the Warm-up test period. His auditory simple reaction time was faster than most peers his age. This above average score on the Sensory/Motor scale indicates that he is likely to be able to process and respond quickly to auditory stimuli.

This person's Visual Sensory/Motor quotient scale score of 106 (PR=66) was in the average range. The mean of his three fastest visual reaction times during the Warm-up test period was used in determining this scale score. This individual's visual simple reaction time revealed him to be similar in performance to most other people his age.

IVA-2 WORKING DIAGNOSIS

These test findings support a working diagnosis of Attention-Deficit/Hyperactivity Disorder, predominantly inattentive presentation, and this individual's pattern of responding was indicative of impairments likely to impact his functioning in the home and work settings. However, it is necessary to determine the occurrence of several inattentive or hyperactive/impulsive symptoms before the age of twelve in order to diagnose ADHD for adolescents or adults. Since the examiner did not identify whether this individual had ADHD symptoms when he was a child, it is essential that the examiner clarify this individual's clinical history in order to make a definitive diagnosis. It will also be necessary that Mild neurocognitive disorder and other mental disorders be ruled out as possible underlying causes for this individual's ADHD symptoms.

His global Full Scale Attention quotient scale score indicated a mild impairment that supported this working diagnosis. Even though this individual's global Full Scale Response Control quotient scale score did not indicate a significant impairment in functioning, his global Sustained Visual Attention quotient scale score did reveal an extreme impairment. While a problem was identified for this individual in respect to his Sustained Visual Attention quotient scale score, his Sustained Auditory Attention quotient scale score was not found to be impaired and fell in the superior range. He was also not identified as making an excessive number of impulsive errors during the test. These IVA-2 findings provide support
The longest and most detailed report available (14 pages). Includes all of the scales reviewed in the Standard and Detailed reports.

It also provides additional component scale data and interpretation of all of the scales is in a more detailed format.

Good training tool for learning how to do IVA-2 analysis

This is the one you want to save & transfer or print out!!
This IVA-2 Comparative Report was prepared in order to examine changes that may have resulted from psychological or medical treatments. It can be used to help titrate medications or to evaluate behavioral interventions. This report may also be useful in examining the impact of concussions or neurodegenerative diseases on attention and response control. Significant increases or decreases in the scale scores are identified and discussed below.

Four of the Attention Global scales showed substantial improvement. None of the Attention and Sustained Attention Global Scales significantly declined. This individual made a significant improvement in his overall ability to pay attention as measured by the Attention Full Scale. The Auditory Attention Scale score of this individual showed a significant increase. The visual attentional functioning for this individual improved significantly as measured by the Visual Attention Scale. The Visual Sustained Attention Scale score of this individual rose significantly.

None of the Response Control Global Scales showed a significant improvement. Only one of the Response Control Global Scales significantly declined. The Visual Response Control Scale score showed a significant decrease.

Of the Key Primary Attention Scales, four showed significant improvement. None of the Key Primary Attention Scales significantly declined. Improvement was found for this individual’s visual attention, demonstrated by a significantly higher Visual Vigilance Scale score on the second test. The ability of this individual to respond quickly to auditory stimuli with less variability of reaction time was significantly greater for the second test administration, as measured by the Auditory Focus Scale. In responding to visual targets, this individual showed less variability in his reaction time, as demonstrated by a higher Visual Focus Scale score. The mean reaction time for this individual’s responses to auditory stimuli, as reflected on the Auditory Speed Scale, was significantly faster for the second test administration compared to the first.

For the Response Control Primary Scales, two showed substantial improvement. Three of the Response Control Primary Scales significantly declined. This individual’s ability to respond to auditory stimuli improved as measured by the Auditory Prudence Scale. A decline was found for this individual’s visual impulsivity control, demonstrated by a lower Visual Prudence Scale score. The Auditory Consistency Scale score, which measures the ability to stay on task for auditory targets, rose significantly. This individual’s ability to respond quickly to auditory stimuli revealed a significant decline during the course of the second test, showing diminished mental endurance that was reflected in the Auditory Stamina scale score. The ability to maintain and improve reaction time in response to visual stimuli over the course of a test was significantly less for the second test administration compared to the first as reflected by the Visual Stamina scale.

No significant difference was found in the Fine Motor Hyperactivity Scale score between the second and first tests.

For the Symptomatic Scales, only one showed substantial improvement. None of the Symptomatic Scales significantly declined. He showed an improvement in his ability to maintain his performance during the Cool-down period after the end of the main section of the IVA-2 test for auditory stimuli based on the Auditory Persistence Scale.
No change is significant unless score change is at least 8 pts (1/2 s.d.)

Retest at same time of day. Preferably in AM, since most are more alert in AM

**Issues:** no sleep, cold medications, stressors, illness, effort. Ask about these before exam.

If on **Stimulant**, test 2 hours after ingestion has worn off or before they take med.

**Stimulant meds:** retest only after 2 weeks on meds

**Score Difference Guideline:**
- < 8 quotient point differences = **No significant change**
- 8-10 points = Slight change
- 11-18 points = Mild Change
- 19 to 27 points = Moderate change
- 28+ point differences = **Major change**
What is their best sensory modality.

Compares auditory and visual processing abilities to help identify appropriate interventions or accommodations.
ADHD Rating Scales

- Must have internet connection. Patient given own password??
- Once a test is administered, up to nine free parent, teacher, and self ADHD rating scales can be completed online.
- The rating scales are auto-scored, and summary data are confidentially downloaded to your computer.
- There is no identifying information on any client online. To maintain confidentiality, the IVA-2 automatically generates a unique random ID and password.
- **Note:** You must administer a test to access the rating scales.
- Both symptom-positive & symptom-negative questions (for congruity, response bias); later asked, if incongruity, to decide on correct response
ADHD Questionnaire example

**ADHD Questionnaire**

**Question 1**

She pays attention to details and is careful in doing schoolwork or tasks on the job.

- Almost Never, Very Rarely
- Seldomly, Infrequently
- Often, Usually
- Almost Always, Very Often

[Next]
Provides the examiner with a working diagnosis based solely on the ADHD rating scales.

It includes a description of the ADHD symptoms and a summary of the ADHD rating scale data collected.
Educators can administer and score the test, download the ADHD rating scale results, and create the diagnostic report.

Please note that in accordance with the Standards for Educational and Psychological Tests, IVA-2 is available only to professionals who meet Level B psychological testing guidelines.

To use IVA-2, you must meet the following minimum criteria: Certification by or full active membership in a professional organization (ASHA, AOTA, APA, AERA, ACA, AMA, NASP, NAN, INS) that requires training and experience in a relevant area of assessment. OR A master’s degree in psychology, education, occupational therapy, speech-language pathology, social work, or in a field closely related to the intended use of the assessment, and formal training in the ethical administration, scoring, and interpretation of clinical assessments.

BrainTrain requires verification of your qualifications for purchase of the IVA-2, but not for who uses it after purchase.
The IVA-2 special language option allows the test stimuli to be presented in any of the following languages: Arabic, Cantonese, Danish, Dutch, French, German, Greek, Hebrew, Hindi, Indonesian, Italian, Japanese, Korean, Mandarin, Norwegian, Pashto, Polish, Portuguese, Russian, Spanish, Swahili, Swedish, Thai, Turkish, Vietnamese, and Welsh.

You can silence the spoken instructions, then translate them for the test taker.

The Language Option now includes ADHD ratings scales in Spanish and Swedish. Scales are available online and in printed format.
Misdiagnosing ADHD

Murphy (1994): 5 things to watch out for:

- Identification of secondary gain (Pt says all right things)
- Other diagnoses (bipolar, depression, anxiety)
- “Performance enhancers” seeking medication for more productivity, esp. among college types
- Report of primarily secondary sx (disorganized, forgetful, underachievement)
- No onset of chronic ADHD in early childhood
▶ IVA-2 includes a test of malingering based on one published study.
▶ Clinicians should consider the exaggeration of ADHD symptoms as part of their evaluation of ADHD.
▶ The ADHD Behavior Rating Scale is easily faked for childhood and current symptoms.
▶ The IVA-2 CPT’s impairment index results revealed it to be highly accurate with a sensitivity 94%, specificity 91%, PPP 88%, NPP 95% for diagnosing individuals in college.
▶ Include a separate effort measure (WMT)
Malingering

The Malingering Analysis provided in the IVA-2 is useful in cases where the examiner suspects the possibility of malingering.

A person with extreme attention and/or response control problems may have such impaired scores that he or she looks like a malingering. Also, random responding may lead to malingering being suggested as a possibility in this analysis.

Since, it would be very rare for an individual under the age of 13 to malinger, no Malingering Analysis is available for children who are twelve years and younger.

The strength of the IVA-2 Malingering Analysis lies in the fact that most “normal” adults make very few errors in their responses to the IVA-2 test stimuli.

If the box marked Malingering Evaluation is checked, then a section will be added to the Standard, Detailed and Comprehensive reports that helps guide the examiner in interpreting the individual’s test scores for possible malingering.

Malingering evaluation method (global score sums):

When the IVA-2 global Auditory Response Control Quotient (ARCQ) is added to the global Auditory Attention Quotient (AAQ) scale score and the total is less than or equal to 118, then possible malingering is indicated.

Also, when the IVA-2 global Visual Response Control Quotient (VRCQ) is added to the global Visual Attention Quotient (VAQ) scale score and the total is less than or equal to 116, then this result indicates possible malingering.
Malingering if: Comprehension and Vigilance primary scales when either their visual or auditory quotient scores were six or more standard deviations below the mean (less than or equal to 40).

The Prudence auditory and visual scales were also identified to suggest possible malingering when either quotient test score was three or more standard deviations below the mean (less than or equal to 55). Only included when at least one of the two IVA-2 global scale indicators of malingering are positive.

Ultimately a clinical decision.
### Analysis 3: Malingering Analysis

**Useful in cases where the examiner suspects the possibility of malingering.**

While this analysis helps the examiner identify possible malingering, it needs to be kept in mind that a person with extreme attention and/or response control problems may have such impaired scores that he or she looks like a malingerer.

Also, random responding may lead to malingering being suggested as a possibility in this analysis.

#### Table: Malingering Analysis Results

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Score</th>
<th>Malingering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auditory Response Validity Check</td>
<td>Valid</td>
<td></td>
</tr>
<tr>
<td>Visual Response Validity Check</td>
<td>Valid</td>
<td></td>
</tr>
<tr>
<td><strong>Auditory Malingering Indicator</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>73 + 121 = 194</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Visual Malingering Indicator</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>125 + 126 = 251</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Comprehension - Auditory</strong></td>
<td>107</td>
<td>No Malingering Identified</td>
</tr>
<tr>
<td><strong>Comprehension - Visual</strong></td>
<td>103</td>
<td>No Malingering Identified</td>
</tr>
<tr>
<td><strong>Vigilance - Auditory</strong></td>
<td>105</td>
<td>No Malingering Identified</td>
</tr>
<tr>
<td><strong>Vigilance - Visual</strong></td>
<td>106</td>
<td>No Malingering Identified</td>
</tr>
<tr>
<td><strong>Prudence - Auditory</strong></td>
<td>92</td>
<td>No Malingering Identified</td>
</tr>
<tr>
<td><strong>Prudence - Visual</strong></td>
<td>117</td>
<td>No Malingering Identified</td>
</tr>
</tbody>
</table>

**Legend:**

- ARQC = Auditory Response Control Quotient
- VRCQ = Visual Response Control Quotient
- AAQ = Auditory Attention Quotient
- VAQ = Visual Attention Quotient
Analysis 5: IVA-QS Comparative Analysis **: 2\textsuperscript{nd} testing

Provides a clear visual comparison between the quotient scale scores of two selected tests.

These graphs and tables offer a quick way to review and assess any changes in functioning after treatment has been completed.

In addition, it can also provide data to assess the effect of medication interventions and or changes in medication dosage levels.
IVA-QS Comparative Analysis: Global Scales
IVA-QS Comparative Analysis: Primary scales

**Attention Primary Scales**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Test 1</th>
<th>Test 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vigilance (A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vigilance (Y)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Focus (A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Focus (Y)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed (A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed (Y)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Response Control Primary Scales**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Test 1</th>
<th>Test 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prudence (A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prudence (Y)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistency (A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistency (Y)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stamina (A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stamina (Y)</td>
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</tbody>
</table>
IVA-QS Comparative Analysis: **Hyperactivity & Symptomatic Scales**

![Graph showing comparative analysis of Hyperactivity and Symptomatic scales.](image_url)
## IVA-QS Comparative Analysis

Name: Public, John

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Full Scale Attention</td>
<td>69</td>
<td>108</td>
<td>39</td>
<td></td>
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<td>Major</td>
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<tr>
<td>Attention Auditory</td>
<td>74</td>
<td>101</td>
<td>27</td>
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<td>Moderate</td>
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<tr>
<td>Attention Visual</td>
<td>71</td>
<td>112</td>
<td>41</td>
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<tr>
<td>Sustained Attention Auditory</td>
<td>55</td>
<td>100</td>
<td>45</td>
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<td>104</td>
<td>32</td>
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<td>Full Scale Response Control</td>
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<td>96</td>
<td>26</td>
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<tr>
<td>Vigilance Visual</td>
<td>68</td>
<td>110</td>
<td>42</td>
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<td>Major</td>
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<tr>
<td>Focus Auditory</td>
<td>84</td>
<td>81</td>
<td>-3</td>
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<tr>
<td>Focus Visual</td>
<td>81</td>
<td>96</td>
<td>15</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Speed Auditory</td>
<td>105</td>
<td>124</td>
<td>19</td>
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<td>Moderate</td>
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<tr>
<td>Speed Visual</td>
<td>92</td>
<td>119</td>
<td>27</td>
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<td>Moderate</td>
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<tr>
<td>Prudence Auditory</td>
<td>82</td>
<td>96</td>
<td>14</td>
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<tr>
<td>Prudence Visual</td>
<td>93</td>
<td>80</td>
<td>-13</td>
<td></td>
<td>Mild</td>
<td></td>
</tr>
<tr>
<td>Consistency Auditory</td>
<td>83</td>
<td>80</td>
<td>-3</td>
<td></td>
<td>--</td>
<td></td>
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<tr>
<td>Consistency Visual</td>
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<td>102</td>
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</tr>
<tr>
<td>Stamina Auditory</td>
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<td>100</td>
<td>8</td>
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<td>Slight</td>
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<tr>
<td>Stamina Visual</td>
<td>78</td>
<td>93</td>
<td>15</td>
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<tr>
<td>Fine Motor Hyperactivity</td>
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<td>104</td>
<td>55</td>
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<td>96</td>
<td>56</td>
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<td>Comprehension Visual</td>
<td>67</td>
<td>102</td>
<td>35</td>
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<td>Major</td>
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<tr>
<td>Sensory/Motor Auditory</td>
<td>107</td>
<td>117</td>
<td>10</td>
<td></td>
<td>Slight</td>
<td></td>
</tr>
<tr>
<td>Sensory/Motor Visual</td>
<td>94</td>
<td>106</td>
<td>12</td>
<td></td>
<td>Mild</td>
<td></td>
</tr>
</tbody>
</table>

* Slight = 8 - 10
* Moderate = 19 - 27
* Mild = 11 - 18
* Major = 26 +
Quintile: 1 block of 100 trials

Tracks a test taker's performance on each quintile of the test.

This analysis provides information about the individual's stamina and performance over the duration of the test.
IVA-2 Quintile Response Analysis: **Quickness & Swiftness**

Quickness
(RT under high demand; maintain pace)

Swiftness
(RT under low demand; promptness, ability to come to attention)

More variability of response expected later in the test; RT can improve or decrease over time
IVA-2 Quintile Response Analysis: **Prudence & Vigilance**

**Prudence**: (commission)

**Vigilance**: omission
**Reliability**: idiopathic commission errors; Impulsive under low demand

**Steadiness**: Idiopathic omission errors under high demand

May reflect learning curve or fatigue
Provides a detailed listing of the test-taker's response to each of IVA's 500 trials, plus the raw data from the Warm-Up and Cool-Down.

Errors are classified by type and tabulated at the end of the analysis to show how many errors loaded onto each Primary scale.
The new IVA-QS (Quick Screening) gives you a complete ADHD screening package – an eight-minute visual and auditory continuous performance test.

Same as IVA-2, except for: 8 minutes, 87% dx accuracy, no malingering analysis, can’t purchase tests without reports; gives only comparative and diagnostic reports
He is a 7 year old male who presents with the primary symptoms of behavioral problems at home, behavioral problems at school, and interrupting others. Symptoms were noted as occurring in the school and home settings. I have determined that these symptoms clearly impair his functioning. Significant hyperactive/impulsive symptoms were observed during the IVA-QS test administration, but no significant ADHD-type symptoms were observed during the clinical intake. This individual's ADHD symptoms are not due to an inability to understand instructions. They are also not due solely to hostile or oppositional behavior.

This individual has not previously been diagnosed as having ADHD. His symptoms have persisted for a sufficient period of time to support a diagnosis of ADHD. One or more family members have been reported as being formally diagnosed with ADHD. This individual was not taking any medication at the time of testing that was likely to affect his test results.

The test results were fully valid, and this individual demonstrated sufficient motivation in completing this test. The rating scales results identified symptoms that supported a possible working diagnosis of ADHD, Combined presentation.

Taking all of the clinical data into account, my diagnosis for this individual is ADHD, Combined presentation, Mild. In order to help him at this time, based on his diagnosis, I am making the following treatment recommendations: cognitive training and neurofeedback. I am recommending that the following reasonable accommodations be made to help this individual in the school setting: assign seating away from doors and windows and assign seating near the teacher towards the front.
### IVA-QS Report Examples

#### REPORTS

<table>
<thead>
<tr>
<th>Report</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostic Report</td>
<td>Provides clinicians with a way to integrate an extensive amount of clinical data into a draft preliminary diagnostic report. To prepare the report, the IVA-2 test requires that the clinician answer a series of relevant key questions necessary to confirming or refuting a diagnosis of ADHD.</td>
</tr>
<tr>
<td>Standard Report</td>
<td>Provides the essential information needed to help guide the clinician in formulating a working diagnosis for individuals who may have ADHD. It reviews the test validity and provides an overview of the Global IVA-2 scales. Descriptions of the different IVA-2 scales, what each scale measures, and what types of response errors will affect each scale score can be found in the section below titled Summary of IVA-2 Scales.</td>
</tr>
<tr>
<td>Comparative Report</td>
<td>Compares data from any two test administrations for the purpose of medication titration, evaluating treatment interventions, or identifying changes due to concussions or brain injuries.</td>
</tr>
<tr>
<td>Rating Scale Report</td>
<td>Provides the examiner with a working diagnosis based solely on the ADHD rating scales. It includes a description of the ADHD symptoms and a summary of the ADHD rating scale data collected.</td>
</tr>
</tbody>
</table>

#### ANALYSES

<table>
<thead>
<tr>
<th>Analysis</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Scale Analysis</td>
<td>Used to obtain a quick overview of the data interpreted in the Standard Report. It helps the examiner identify how an individual performed relative to others’ of the same sex and age group.</td>
</tr>
<tr>
<td>Comparative Analysis</td>
<td>Provides a clear visual comparison between the quotient scale scores of two selected tests. These graphs and tables offer a quick way to review and assess any changes in functioning after treatment has been completed. In addition, it can also provide data to assess the effect of medication interventions and or changes in medication dosage levels.</td>
</tr>
</tbody>
</table>
The IVA-AE (Advanced Edition) is a combined visual and auditory continuous performance test of attention and response control. It is the only CPT designed specifically to help clinicians identify and measure attention problems in the adult population.

The IVA-AE is normed for ages 18 – 50 (N=236, divided by gender). It can be used either alone or in conjunction with the IVA+Plus.

The task is quite challenging – visual and auditory numbers from 2 to 8 are presented at one-second intervals; the task is to click when you see a 3 or hear a 5. Different numbers are presented simultaneously visually and aurally.
The main objective of this structural magnetic resonance imaging (MRI) study was to investigate, using diffusion tensor imaging, whether a neurofeedback training (NFT) protocol designed to improve sustained attention might induce structural changes in white matter (WM) pathways, purportedly implicated in this cognitive ability.

Another goal was to examine whether gray matter (GM) volume (GMV) might be altered following NFT in frontal and parietal cortical areas connected by these WM fiber pathways.

Healthy university students were randomly assigned to an experimental group (EXP), a sham group, or a control group. Participants in the EXP group were trained to enhance the amplitude of their β1 waves at F4 and P4. Measures of attentional performance and MRI data were acquired one week before (Time 1) and one week after (Time 2) NFT. Higher scores on visual and auditory sustained attention were noted in the EXP group at Time 2 (relative to Time 1). As for structural MRI data, increased fractional anisotropy was measured in WM pathways implicated in sustained attention, and GMV increases were detected in cerebral structures involved in this type of attention. After 50 years of research in the field of neurofeedback, our study constitutes the first empirical demonstration that NFT can lead to microstructural changes in white and gray matter.
In this study, 20 subjects with dementia (9 of Alzheimer’s type, and 11 with vascular dementia) were treated using qEEG-guided neurofeedback training.

The Mini Mental Status Examination (MMSE) was used as the primary outcome measure.

The results showed an increase of the MMSE scores for all subjects regardless of dementia type with an average MMSE score increase of 6 points, which was found to be significant.

To our knowledge this is the first time the same modality was shown to be beneficial in both dementia groups.
ADHD evaluation in adults is complicated by the high rate of disorders that overlap symptoms with ADHD.

CPTs are quite sensitive to CNS dysfunction. This is both a strength and a weakness of CPTs in that multiple disorders can result in impaired performance on a CPT.

There are multiple variations of CPTs available, some of which may be more sensitive or demonstrate better specificity to ADHD in adults than others. If CPTs are to be used clinically, further research will be needed.
The ADHD Behavior Checklist and the IVA-CPT were examined using undergraduates \((n=44)\) randomly assigned to a control or a simulated malingerer condition and undergraduates with a valid diagnosis of ADHD \((n=16)\).

They thought that malingerers would successfully fake ADHD on the rating scale but not on the CPT.

They found that the ADHD Behavior Rating Scale was successfully faked for childhood and current symptoms. IVA CPT could not be faked on 81% of its scales. The CPT’s impairment index results revealed: sensitivity 94%, specificity 91%, PPP 88%, NPP 95%. Results provide support for the inclusion of a CPT in assessment of adult ADHD.
The IVA and Neuropsychological Impairment Scale (NIS) were completed by adults with mild traumatic brain injury (mTBI), adults diagnosed with attention deficit hyperactivity disorder (ADHD) and controls.

On the IVA CPT, the mTBI and ADHD groups performed significantly lower on the full and secondary scales for attention and response accuracy. For individual scales, the mTBI and ADHD groups showed lower performance on measures of reaction time, inattention, impulsivity, and variability of RT.

mTBI and ADHD groups showed similar patterns of performance on the IVA.

On the NIS, the mTBI and ADHD groups reported more neuropsychological symptoms than the control group and the mTBI group reported more neuropsychological symptoms than the ADHD group.


References Continued

