

# IVA-2 Comprehensive Report

Name: Case, Sample 3

Age: 44 Sex: F Report Date: 11/11/2016 Test Date: 11/9/2016 03:05 PM On Meds: U

## OVERVIEW OF THE IVA-2 CPT AND GENERAL INTERPRETIVE GUIDELINES

This IVA-2 Comprehensive Report requires the test to be administered in accordance with the specified test guidelines under the supervision of a licensed health care professional who is qualified in the use and interpretation of psychological tests. The test is not to be used as a standalone diagnostic instrument. By itself, it does not identify the presence or absence of any clinical diagnosis. The function of the IVA-2 CPT is to aid examiners in making their diagnosis as part of a comprehensive evaluation of clients who present with ADHD-type symptoms. The relevant strengths and weaknesses for each of the Attention and Response Control Global Scales will be reviewed. Detailed descriptions of the test scales are included in this report. Suggested recommendations based on identified strengths and deficits are also provided to help individuals.

The IVA-2 CPT (Integrated Visual & Auditory 2 Continuous Performance Test) is a test of attention and impulsivity that measures responses to 500 intermixed auditory and visual stimuli spaced 1.5 seconds apart. The task is to click the mouse to the target stimuli which is either an auditory or visual "1" and to refrain from clicking when the foil stimulus (i.e., an auditory or visual "2") is presented. The quotient scores for all of the IVA-2 scales are reported as standard scores (Mean = 100, SD = 15). The percentile ranks for the standard scores are also reported. The main test lasts about twelve minutes.

In accordance with professional standards this confidential report is only to be distributed to others after it has been carefully reviewed, modified as needed, and signed by the examiner. The report provides interpretive suggestions and hypotheses for the examiner to consider, but it is not to be construed as prescriptive, definitive, or diagnostic. The clinical determinations that 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.

## VALIDITY OF IVA-2 TEST RESULTS

The IVA-2 test was taken on a Windows PC. There are two separate validity checks for this test. First, during the Warm-up and Cool-down phases of the test, the individual must demonstrate comprehension of the test instructions by clicking correctly to simple visual and auditory test targets at least three times. Second, there is a validity check during the main section of the test that evaluates whether the individual's response pattern was erratic. This would indicate numerous random responses and a failure to respond in accordance with the test instructions.

The Senory/Motor validity check is based on whether or not this individual can adequately respond to the simple tests on which the Auditory and Visual Sensory/Motor

scales are based. During both the Warm-up and Cool-down phases of this test, this individual made valid responses to auditory stimuli. She also made valid responses to visual stimuli during the Warm-up and Cool-down phases. The quotient scores and simple reaction times for these scales are provided in the Standard Scale Analysis. Since she was able to validly respond to both sensory modalities during the Warm-up and/or Cool-down phases, the examiner can interpret the Sensory/Motor validity test as showing that she was able to adequately understand the basic instructions of this test.

The main test results were found to be valid. All global and primary test scale scores can be interpreted without reservation. This individual's response pattern did not reveal any apparent abnormalities in her responses to either visual or auditory test stimuli. The examiner can proceed in an interpretation of all visual and auditory test scores without reservation.

### **SUMMARY OF TEST RESULTS FOR THE IVA-2 GLOBAL SCALES**

The Full Scale Response Control Quotient is a global measure of the overall ability for this individual to regulate her responses and respond appropriately. Factors that load on this scale include the ability to inhibit responses to non-targets, the consistency of recognition reaction times and the person's ability to maintain her mental processing speed during the IVA-2 test. This individual's overall global quotient scale score for the **Full Scale Response Control** scale was 98 (PR=46). This score fell in the average range. Her **Auditory Response Control** quotient scale score was 112 (PR=79). This global scale score fell in the above average range. The **Visual Response Control** quotient scale score for this individual was 84 (PR=14). This global scale score fell in the mildly impaired range.

The Full Scale Attention Quotient provides a measure of an individual's overall ability to accurately and quickly respond while maintaining focus. This global scale primarily measures performance under low demand conditions. This individual's overall quotient score on the **Full Scale Attention** scale was 105 (PR=62). This global scale score fell in the average range. Her **Auditory Attention** quotient scale score was 108 (PR=69), and this global scale score fell in the average range. The **Visual Attention** quotient scale score for this individual was 101 (PR=54). This global scale score was classified as falling in the average range.

The Combined Sustained Attention quotient scale score provides a global measure of a person's ability to accurately and quickly respond in a reliable manner to stimuli under low demand conditions. In addition, it includes the ability to sustain attention and be flexible when things change under high demand conditions. This global measure of sustained attention is comprised of the following scales: Acuity, Dependability, Elasticity, Reliability, Steadiness, and Swiftness. These are reported as separate scale scores for both the auditory and visual modalities. This individual's global quotient score on the **Combined Sustained Attention** scale was 110 (PR=76). This score fell in the above average range. Her global **Auditory Sustained Attention** quotient scale score was 117 (PR=86), and it fell in the above average range. The global **Visual Sustained Attention** quotient scale score for this individual was 103 (PR=58). This score was found to fall in the average 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.

## ATTENTION PRIMARY SCALES

### Vigilance, Acuity, and Elasticity

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. Analyzing the Acuity and Elasticity scales can help pinpoint the conditions when the problems are most prevalent. Acuity measures errors of omission that occur when targets are infrequently presented (i.e., low demand conditions). Elasticity assesses the person's ability to click to a target that immediately follows a non-target under high demand conditions (i.e., when targets are frequent) and is described as a propensity error of omission.

This person's **Auditory Vigilance** quotient scale score was 108 (PR=69), which falls in the average range. This individual did not show any problems with her general auditory attentional functioning. She did not miss many key auditory stimuli. She is likely to demonstrate good attentional functioning and listening skills in the work environment. If problems do exist that suggest attentional difficulties, the impact of environmental stimuli and social distractors needs to be considered. Also, if this individual shows attentional problems, other emotional, cognitive, or psychological causal factors may exist. Further clarification is provided below regarding any variability in her auditory attentional functioning as well as any identified strengths in auditory attention.

This individual's quotient score was 106 (PR=66) on the **Auditory Acuity** scale. This quotient score was in the average range. The Auditory Acuity scale showed that she did not have any difficulty paying attention under low demand conditions.

This individual's **Auditory Elasticity** quotient scale score was 105 (PR=62). This quotient score fell in the average range. The Auditory Elasticity scale showed that she did not have any difficulty being accurate and mentally flexible in her attentional functioning under high demand conditions.

This individual's auditory performance was essentially the same under both the high and low demand conditions that comprise the Auditory Vigilance scale. No significant difference was found between her Auditory Elasticity and Auditory Acuity quotient scale scores. Her ability to respond accurately to auditory test targets was relatively stable and consistent and was not affected by the frequency of the target presentation or whether targets were preceded by a non-target.

This person's **Visual Vigilance** quotient scale score of 105 (PR=62) fell in the average range. This individual did not show any problems with her general visual attentional functioning. She did not miss many key visual stimuli and is likely to demonstrate good attention in the work environment. If attention problems do exist, the impact of environmental stimuli and social distractions needs to be considered, or other emotional, cognitive, or psychological causal factors may need to be explored. Further discussion on her specific problems with visual attention and whether there is any difference between her functioning on low and high demand conditions will be provided below.

She had an average **Visual Acuity** scale with a quotient score of 105 (PR=62). The Visual Acuity scale showed that she did not have any difficulty paying attention under low demand conditions.

This individual's **Visual Elasticity** quotient scale score was average with a score of 105 (PR=62). The Visual Elasticity scale reflects that she was able to remain accurate and mentally flexible in her visual attentional functioning under high demand conditions.

No significant difference was found between her Visual Elasticity and Visual Acuity quotient scale scores. Her ability to respond accurately to visual test targets was found to be relatively stable and consistent under both high and low demand conditions and was not affected by the frequency of the target presentation or whether targets were preceded by a non-target.

She was found to have strengths in both the auditory and visual domains with respect to her ability to remain vigilant. Consequently, she is not likely to lose her attention or make careless errors, even under demanding conditions. She has the potential to use her cognitive strength to perform well and be accurate and detailed in her work. These strengths are likely to enable her to function well in a variety of different learning environments.

### **Focus, Dependability, and Stability**

The Focus scale reflects an individual's ability to sustain attention reliably and not "drift off" or "tune out." It is a Primary scale that is an important contributing factor in the assessment of global attentional functioning. Impairments in Focus result from relatively frequent slow response times to test stimuli that occur sporadically. These delays in response may occur due to momentary lapses in attention, confusion caused by deficits in working memory, episodic mental fatigue or deficits in sustaining attention.

This individual's **Auditory Focus** quotient scale score of 114 (PR=82) fell in the above average range. She demonstrated a strength in her ability to stay focused to auditory stimuli during the test and resist being distracted by internal thoughts or external auditory distractions. She is likely to be able to maintain her focus and utilize her working memory to accurately process verbal information better than most other people. Errors due to lapses in auditory attention are not likely to occur for her. In a demanding environment, she is likely to rise to the occasion and stay on track.

Her ability to respond reliably to auditory stimuli was evidenced by the **Auditory Dependability** scale. Her quotient score on this scale was 111 (PR=76), which falls in the above average range. Her response times to auditory stimuli did not significantly vary under low demand conditions.

In respect to recognition reaction time, she was able to respond in a reliable manner as evidenced by the **Auditory Stability** scale. Her quotient score on this scale was 111 (PR=76), which falls in the above average range. She demonstrated the ability to maintain her speed of response to auditory stimuli well under high demand conditions.

This person's **Visual Focus** quotient scale score of 89 (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. She needs to be encouraged to ask for any information she misses due to her slight problems with visual focus, and she should learn to ask others for help when necessary. Generally, her problems with visual focus will only manifest in highly distracting environments or when she is emotionally upset. Cognitive training exercises can help her learn to be better focused to visual stimuli and to recognize how to maintain her visual attention.

Her **Visual Dependability** scale indicated a relative strength. Her quotient score was average with a score of 94 (PR=34).

A strength was found for her with respect to the **Visual Stability** scale. Her quotient score on this scale was 100 (PR=50), which falls in the average range. She demonstrated the ability to make reliable responses to visual stimuli under high demand conditions.

### **Speed, Quickness, and Swiftness**

The Speed scale is based on the mean recognition reaction time (RRT) for all correct responses. This Primary scale is an important measure of global attentional functioning. The recognition reaction time (RRT) of individuals, either to the visual or to the auditory stimuli used in IVA-2, can be conceptualized as three separate brain functioning processes. RRT is the total time it takes the individual (1) to see the target, (2) to recognize that it is a target requiring the initiation of a response, and (3) to make the correct motor response. Correct responses are defined as one or more clicks occurring at 125 ms or more to the auditory or visual target. Spurious clicks exhibiting response times of less than 125 ms are excluded in the calculation of the mean recognition reaction time for the Speed scale. Based on this theoretical model, the following formula would apply:

$$\text{RRT} = \text{PT} + \text{DT} + \text{MT}$$

PT is perception time, DT is discriminatory/decision processing time, and MT is motoric reaction time. Perception time is a measure of the time between the presentation of the stimulus and the individual's detection of that stimulus. Discriminatory/Decision processing time represents the amount of time it takes the individual to discriminate and decide whether the stimulus is the defined target or not and then whether to initiate a response or not. The motoric reaction time variable in this formula is the specific time needed for the muscles to implement a response when a "go" decision has been made. This individual's ability to process information and make decisions, as measured by the Speed scale, is an important variable that is likely to impact her performance in employment settings with respect to being able to get work done within a reasonable time frame and with an acceptable degree of accuracy.

This individual's **Auditory Speed** quotient scale score of 96 (PR=38) falls in the average range. This individual did not show any problems with her overall auditory processing speed. Her recognition reaction time falls within the average range. Her processing speed shows that she is able to perceive quickly and respond adequately to auditory stimuli. If problems exist with respect to listening skills, organizational abilities, working memory, emotional self-regulation, reading, or the ability to finish work tasks in a timely manner, the impact of environmental stimuli and social distractions needs to be evaluated and considered. In addition, emotional, cognitive, or psychological problems may need to be considered as possible causal factors. Deficits that occur for other IVA-2 scales may be contributory factors to any identified problems. Further clarification is provided below regarding other IVA-2 scales that may impact this individual's Auditory Speed.

This individual's **Auditory Quickness** quotient scale score of 93 (PR=31) falls in the average range. Her quotient score on the **Auditory Swiftness** scale was 111 (PR=76). This quotient score is interpreted as above average. Her score on the Auditory Swiftness scale is significantly higher than her Auditory Quickness score. This indicates that she performed faster under low demand conditions (i.e., when the non-targets were prevalent). When the required pace to process auditory test stimuli was slower, she was able to respond quicker than when the demand to perform was high. This individual is not

likely to respond well when pressured to perform. She is likely to do better when auditory information is presented to her more slowly.

She had an average **Visual Speed** quotient scale score of 108 (PR=69). No problems were found with her overall visual processing speed. Her recognition reaction time falls within the average range. Her processing speed shows that she is able to perceive quickly and respond adequately to visual stimuli. If problems exist with respect to organizational abilities, visual memory, emotional self-regulation, or the ability to finish work tasks in a timely manner, the impact of other causal factors will need to be evaluated and considered. These factors may include environmental stimuli, social distractions, and emotional, cognitive, or psychological problems. Deficits that occur for other IVA-2 scales may also be contributory factors to any identified problems. Further clarification is provided below regarding other IVA-2 scales that may impact this individual's Visual Speed.

This individual's **Visual Quickness** quotient scale score of 110 (PR=76) falls in the above average range. She had an average **Visual Swiftness** scale score of 98 (PR=46). For visual targets, she was significantly faster under high demand conditions, as reflected by her higher Visual Quickness score in comparison to Visual Swiftness. She was slower to a noticeable degree in her visual processing speed under low demand conditions when the targets were rare. Consequently, she is likely to perform better in learning situations when there is a high expectation for performance and when she is actively engaged in the task.

## **RESPONSE CONTROL PRIMARY SCALES**

### **Prudence and Reliability**

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. Three types of commission errors load on this scale. The first type of error occurs when an individual clicks to a non-target during the test period when the targets are prevalent. The second type is the propensity error of commission which is defined as clicking to the foil, immediately after a target is presented during the period of the test when the non-targets are prevalent. The third type is a subtle impulsivity error called a "mode shift" error of commission. A visual mode shift error occurs when the individual clicks to a visual non-target that immediately follows a minimum of two auditory non-targets. The auditory mode shift error is defined as clicking to an auditory non-target that immediately follows a minimum of two visual non-targets. All of these prudence errors reflect difficulty in making the correct response to an unexpected change in environmental stimuli.

This individual's **Auditory Prudence** quotient scale score of 111 (PR=76) fell in the above average range. She demonstrated a strength with respect to her ability to inhibit responses to auditory stimuli during the IVA-2 test. This strength indicates the ability to inhibit and shift mental sets better than peers. She may be able to use this ability to compensate for any other areas of weakness in her attentional or cognitive functioning in her life. This ability indicates that she is not likely to make careless errors to auditory stimuli and that she has the ability to stop and think rather than overreact when stressed in her daily life. In cases where there are identified functional problems with inhibition or self-control with respect to auditory stimuli, causal psychological or emotional factors other than ADHD would need to be considered.

She did not demonstrate any problems with respect to the **Auditory Reliability** scale. Her quotient score on this scale was 100 (PR=50), which falls in the average range.

Thus, she was able to avoid making impulsive idiopathic errors that would manifest as careless or inappropriate responses in her home or work environments. This individual is likely to have the ability to be accurate in detailed tasks and to remember and follow rules well.

This person's **Visual Prudence** quotient scale score of 89 (PR=24) fell in the slightly impaired range. She had difficulty at times inhibiting her responses to non-targets. External prompting and/or other behavioral interventions may help to improve her awareness and to reduce her impulsivity to visual stimuli. This slight impairment is not likely to significantly affect her performance in most life situations. Typically, medication would not need to be considered. However, she may benefit from brief therapeutic interventions. If significant problems in self-regulation exist, they may be due to psychological and/or emotional factors other than ADHD.

No problems were found with her **Visual Reliability** scale. Her quotient score on this scale was 105 (PR=62), which falls in the average range. She was able to avoid making numerous impulsive idiopathic errors. However, her higher score on the Visual Reliability scale relative to the Visual Prudence scale indicates problems in impulse control under high demand conditions. This individual knows the rules that she is supposed to follow, but has difficulty "putting on the brakes." She is also likely to have more difficulty with response control primarily when transitions occur or when pressured to respond quickly. This individual's weaknesses in self-control were found to be specific to the visual sensory modality of the Prudence scale. Her relative strength in the auditory domain for the Prudence scale is likely to help her compensate for her problems with visual inhibition.

## **Consistency**

The Consistency scale is a general measure of an individual's ability to respond reliably based on her reaction time. Consistency is an important Primary scale for understanding and evaluating response control. It provides a means to assess the variability of the majority of the responses that a person makes to test targets. In order to do so it is calculated by specifically excluding both the very fast and very slow responses. In contrast, the Focus scale is a measure of the variability of the reaction time responses to all of test targets. Consistency is considered indicative of an individual's ability to sustain her attention in order to produce responses that reflect stable, reliable, integrated brain functioning.

This individual was above average in her ability to be consistent in her responses to auditory stimuli. Her **Auditory Consistency** quotient scale score was 111 (PR=76). This strength indicates the ability to sustain attention without being distracted by internal or external auditory stimuli. This individual is likely to be able to use her working memory well. She is not prone to making careless errors, and is also likely to be able to "catch her own mistakes." Even when the pace becomes quick, she is generally able to keep up and grasp new concepts quickly.

This individual's ability to be consistent in her responses to visual stimuli was average. The **Visual Consistency** quotient scale score for this individual was 92 (PR=31). Visual distractions are not generally a problem for this individual. She is able to be reliable and consistent in her responses to visual stimuli and can also ignore visual diversions. She is not likely to make careless errors in written work or to misperceive written instructions unless other deficits in attentional functioning exist.

## Stamina

The Stamina scale is a measure of the individual's ability to sustain her speed of response time during the course of the test. This scale is a Primary scale and is an important measure of response control. It is derived by comparing the mean reaction time of the first 200 trials to that of the last 200 trials. The raw score for this scale is based on a ratio of these two mean scores and is expressed as a percent. If the individual is slower in her response times at the end of the test, the raw score will be reflected in a percent score of less than 100%. In the rare case where the individual performs faster in the latter half of the test, the raw score will be greater than 100%.

This individual's **Auditory Stamina** quotient scale score of 99 (PR=46) fell in the average range. This person's response time to auditory stimuli did not change significantly over the course of the test. She was able to maintain her mental processing speed in the auditory domain during the test. In a work setting, she is likely to be capable of meeting the demand to perform and to achieve goals in a timely manner. It would be rare for her not to get her work done unless other psychological or emotional factors are present that impair her functioning in other ways. Her work habits are likely to reflect the ability to persevere with respect to her auditory processing speed even when she is faced with challenging tasks.

She had an average **Visual Stamina** quotient scale score of 92 (PR=31). This person's response time to visual stimuli did not change significantly over the course of the test. She was able to maintain her mental processing speed in the visual domain during the test. In a work setting, she is likely to be capable of meeting the demand to perform and to achieve goals in a timely manner. In her work habits, she is likely to double her efforts and meet most demands even when she is faced with challenging visual tasks.

## 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.

Sometimes, individuals will click impulsively when the instructions are being given to them during the Warm-up section of the IVA-2. Generally, this type of error may be attributed to a person's difficulty listening accurately to instructions. It may also occur for people who have impulsive tendencies and are more impatient than most other people. In the IVA-2, this type of error is labeled as a "spontaneous" mouse click and is defined as occurring only during the instructional periods that precede the Warm-up and Practice Sessions.

Some IVA-2 test-takers will exhibit off-task behavior in another way. These individuals "play" with the mouse by holding the mouse button down. If this behavior occurs during the Warm-up section of the IVA-2 test, the test-taker is warned and instructed not to repeat this error. Only during the main section of the test do errors of this type load onto the Fine Motor Hyperactivity scale. These actions generally occur when the individual engages in inappropriate, "testing the limits" behavior. Occasionally, a high incidence of

this type of fine motor error is due to the fact that an individual holds down the right mouse button while she uses her index finger to click the left mouse button. If the examiner sees a high number of "holding" errors, he or she needs to be sure that the individual being tested did not keep the right button held down during the course of the test. Such behavior, if done frequently, is very likely to result in invalid IVA-2 test results.

Spurious errors are also made by some IVA-2 test-takers. This type of error only occurs during the main test. It is defined as clicking the mouse in a haphazard, anticipatory, or random manner, such that the reaction time speed for that particular trial is less than 125 milliseconds (ms). Extensive testing has shown that it is not possible for individuals to perceive and initiate their responses to the IVA-2 visual or auditory stimuli faster than 125 ms. For most people, simple reaction time speed has been found to range between 200 and 600 ms. Clicking the mouse such that the reaction time speed is less than 125 ms is considered an invalid response that is reflective of the individual making anticipatory or spurious responses.

The most common type of fine motor hyperactivity error is described as a fidgety, impulsive response. It occurs whenever the test-taker makes one or more additional clicks either to a target or non-target stimuli during the main test.

This person's **Fine Motor Hyperactivity** quotient scale score was 99 (PR=46). Her score fell in the average range. She made 4 spontaneous responses while the instructions preceding the Warm-up and Practice sessions were being delivered. During the test, she never held the mouse button down. Thus, no mouse button holding errors were identified. She made no spurious errors. This type of error is defined as making a response with a reaction time less than 125 milliseconds. She did not click the mouse button more than once for any response during the main test.

This average quotient score for the Fine Motor Hyperactivity scale indicates no significant problems in fine motor hyperactivity. She is unlikely to exhibit problems with fidgety, impulsive, or off-task behavior in her home or work environment. It would be rare for this individual to be distracted by feelings of restlessness. She may be reasonably tolerant of "boring" tasks. Unless other impairments in response control or attentional functioning are identified, it is very likely that she can sit reasonably still and be quiet.

The lack of problems shown on the Fine Motor Hyperactivity scale suggests that she is likely to be able to follow simple general rules and not demonstrate fidgetiness. In many cases, this average score on the Fine Motor Hyperactivity scale is considered a positive indicator regarding her ability to refrain from distracting others while they are working. However, she may possibly have problems related to gross motor hyperactivity that will be evident in social situations that may negatively impact her interactions with others. A high score on the Fine Motor Hyperactivity scale does not by itself rule out the possibility of gross motor hyperactivity either during the test or in other environments.

## **SYMPTOMATIC SCALES**

### **Comprehension, Steadiness, and Reliability**

The Comprehension scale is a measure of idiopathic 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.

The Comprehension scale is a composite scale based on the Steadiness and Reliability scales. The Steadiness scale is comprised of idiopathic errors of omission that

occur under high demand conditions; in other words, the individual fails to click to a target when the targets are frequent. The Reliability scale is comprised of idiopathic errors of commission that occur under low demand conditions. For example, a Reliability error occurs when the individual clicks one or more times to a non-target under low demand conditions.

When an individual responds in a random, impulsive manner to test stimuli, there will be a high frequency of idiopathic errors of commission. This random pattern will be evident to the examiner in most cases, because the individual's Reliability quotient score will be very low. As discussed above, the Reliability scale is a measure solely of idiopathic errors of commission. An extremely high degree of random, impulsive responding may result in an invalid test profile for either the auditory or visual sensory modality or for both. When one or more of the sensory modalities is found to be invalid, the Comprehension score is still reported and in almost all cases, will fall in the extremely impaired range.

When the Comprehension scale quotient score is very low, it may also be the result of very careless responding or extreme inattention. In some cases, when an individual frequently fails to respond to test targets or stops responding altogether, this response pattern will invalidate the IVA-2 results due to the very high degree of idiopathic errors of omission. The Steadiness scale provides a measure of these idiopathic errors of omission. It needs to be pointed out that errors on the Prudence and Vigilance scales are not included on the Comprehension scale. Comprehension errors may be described as "oddball" errors and are not specifically pulled for by the IVA-2 test pattern design.

This individual's **Auditory Comprehension** quotient scale score of 106 (PR=66) 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, she performed well with respect to her ability to follow the test rules. She did not demonstrate any significant problems with respect to the Auditory Comprehension scale that would impact her life. Further discussion regarding any relative weaknesses or strengths is presented below for the Steadiness and Reliability scales that comprise the Comprehension scale.

Her **Auditory Steadiness** quotient scale score was 109 (PR=73). This quotient score fell in the average range. This individual was not identified to have any significant problems with attention to auditory stimuli as measured by the Steadiness scale. This individual comprehended the rules fully that required her to respond to auditory targets when they were prevalent, and she did show any difficulty in performing the test task, as measured by the Steadiness scale.

On the **Auditory Reliability** scale, she had a quotient score of 100 (PR=50). This quotient score was in the average range. She was not found to have problems with respect to the Auditory Reliability scale. The number of errors she made was not excessive. Her score showed that she was not impulsive in this way and made few "oddball" responses to auditory stimuli under low demand conditions.

This individual's **Visual Comprehension** quotient scale score of 105 (PR=62) fell in the average range. Her Visual Comprehension scale did not indicate any major problems. Overall, she performed well with respect to her ability to follow the test rules. No significant impacts in her life should be expected with respect to Visual Comprehension. No major problems with functioning and performing adequately on the IVA-2 test were found for the Visual Comprehension scale. Overall, she performed well with respect to her ability to follow the test rules. She did not demonstrate any significant problems with respect to the Visual Comprehension scale that would impact her life. Further discussion

regarding any relative weaknesses or strengths is presented below for the Steadiness and Reliability scales that comprise the Comprehension scale.

She had an average **Visual Steadiness** quotient scale score of 104 (PR=62). No significant problems with attention to visual stimuli were identified under high demand conditions. She was able to respond accurately and maintain her effort when the targets were frequent. This individual understood the rule that required her to respond to visual targets when they were prevalent, and overall she showed good visual attentional attention.

On the **Visual Reliability** scale, she had a quotient score of 105 (PR=62). This quotient score was in the average range. No problems were found with respect to her Visual Reliability scale. She did not make an excessive number of "oddball" responses to visual stimuli under low demand conditions.

### **Persistence**

The Persistence Scale is one of the three Symptomatic scales and is used to compare the speed of simple reaction time at the beginning of the test to that measured at the end of the test. It is useful in helping to identify factors that may affect performance and/or possibly reflect underlying attitudinal or behavioral characteristics of the test-taker.

It is derived by dividing the mean simple reaction time of the fastest three responses occurring during the Warm-up by the mean simple reaction time of the fastest three responses occurring during the Cool-down. This calculation is done for both the auditory and visual modalities. The resulting ratio is converted into a percentile raw score. Percentile scores of less than 100% reflect that the individual's mean simple reaction time was slower during the Cool-down than during the Warm-up period. In other words, the test-taker slowed down between the beginning and the end of the test. Likewise, if the percent raw score is greater than 100%, the individual's mean reaction time during the Cool-down period was faster than the mean reaction time measured during the Warm-up period.

The Warm-up period provides practice in using the mouse and establishes a baseline in terms of simple reaction time. When the mean reaction time of the Cool-down period is significantly slower than that measured during the Warm-up period, this score indicates possible problems performing after the main test task is completed. This slower mean reaction time may be due to motor or mental fatigue, an oppositional attitude, or a decrease in motivation to do any additional tasks. In contrast, when an individual demonstrates a faster mean reaction time after completing the IVA-2, this score is indicative of an effort to continue to perform well all the way to the end of the test.

This individual's **Auditory Persistence** quotient scale score of 85 (PR=16) fell in the slightly impaired range. She was slower in her auditory reaction time during the Cool-down as compared to the Warm-up period. This slower reaction time after the main section of the IVA-2 test indicates the possibility of some motor or mental fatigue for auditory stimuli. Toward the end of the test, she may also have wavered in her motivation to perform to the best of her ability. However, given the range that her Auditory Persistence score fell in, her slower processing speed during the Cool-down period is not considered a significant factor that would impact her auditory test performance or her functioning in life related to auditory processing.

This person's **Visual Persistence** quotient scale score of 90 (PR=24) fell in the average range. No significant difference was found in her visual reaction time during the Cool-down as compared to the Warm-up. Thus, her quotient score on the Persistence

scale did not indicate any problems with her motivation that would impact her functioning on the IVA-2 test. Given that her Visual Stamina quotient score fell in the average range, she was not found to show any mental or motoric fatigue in respect to her ability to respond to visual stimuli. This pattern of responding indicates that she is not likely to become easily fatigued when she has to process visual stimuli.

### **Sensory/Motor**

The Sensory/Motor scale provides a measure of an individual's simple reaction time. This scale is one of the two Symptomatic scales and can be useful in identifying factors that may affect performance on other IVA-2 scales. First, the mean simple reaction time of the three fastest trials is computed based on either the Warm-up or Cool-down sections of the IVA-2, selecting whatever section has the three fastest reaction times. The mean reaction time of these three trials becomes the raw score for the Sensory/Motor scale. During both the Warm-up and Cool-down test periods, ten visual targets are presented, followed by ten auditory targets, and there are no foils presented during either of these periods. The simple reaction time used as the raw score for the Sensory/Motor scale is theoretically based on the person's Perception Time (PT) + Motoric Reaction Time (MT).

The purpose of the Sensory/Motor scale is to identify any problems related to the underlying integrity of an individual's sensory/motor system. A very slow simple reaction time may possibly influence the Speed or Global Attention scale scores. In some rare cases, a very slow reaction time may indicate underlying neurological problems. People can be challenged by the demand to focus and react quickly to stimuli for a variety of different reasons, including emotional, psychological, and learning difficulties. A person with a high level of anxiety may hesitate and respond more slowly than others, due to feelings of insecurity and fear of making mistakes. Individuals may also vary in their interpretation of the instructions given for the Warm-up and Cool-down. In response to the instruction to "Be as quick as you can, but be careful, too," some individuals may respond as soon as they see a target on the screen, since they are also told that they will only see targets. Others may wait just a little before clicking to be sure that they are seeing a target.

For these reasons, only the fastest three reaction times are used to derive the mean of the Sensory/Motor raw scale score in an effort to obtain a relatively accurate and reliable measure of simple reaction time for each individual. However, it is recommended that this scale be interpreted with some caution due to the numerous factors that may affect it and the limited number of trials used to derive it. Usually, only when the scores are in the severe or extreme range should the examiner give weight to this scale's possible impact on the IVA-2 test performance or relevance to life functioning.

This individual's **Auditory Sensory/Motor** quotient scale score of 126 (PR=96) fell in the superior range. This scale score was computed based on the mean of the three fastest reaction times of her auditory responses during the Warm-up test period. Her auditory simple reaction time was faster than most peers her age. This superior score on the Sensory/Motor scale indicates that she is likely to be able to process and respond quickly to auditory stimuli. Her quotient score on the Sensory/Motor scale did not reveal any problems with functioning that would impair her test performance or affect her in her life. Given that her Auditory Speed quotient score fell in the average range, she was not found to have difficulties related to her auditory recognition reaction time. These two aspects of her functioning indicate that she is able sustain her effort and to process information as quickly as or more quickly than others under both simple and demanding

conditions. She demonstrated good mental processing speed for auditory stimuli on the test and is likely to be able to perform well in life on tasks requiring auditory processing.

This person's **Visual Sensory/Motor** quotient scale score of 109 (PR=73) was in the average range. The mean of her 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 her to be similar in performance to most other people her age. No significant difficulties were found on the Sensory/Motor scale for this person that would impair her test performance or affect her in her life. Given that her Visual Speed quotient score fell in the average range, she was not found to have problems related to her visual processing reaction time. These two aspects of her functioning indicate that she is able sustain her effort and to process information well under a variety of conditions. She demonstrated good overall mental processing speed in responding to visual test targets and is likely to be able to perform well in respect to her speed of processing on visual tasks in her daily activities.

### **MeSA-AE EXECUTIVE CONTROL SCALE**

The MeSA-AE Executive Control Quotient (ECQ) scale score is a global scale based on the total time that it takes to complete both Test A and Test B. There are nine specific cognitive skills that are required to perform well on the MeSA-AE test. These nine cognitive skills include selective attention, visuospatial sequencing, fine motor control, response inhibition, sustained attention, central processing speed, alternating attention, visuospatial classification and working memory. On both Test A and Test B the test takers are required to identify the correct targets based on a rule and will need to utilize their selective attention, visuospatial sequencing, alternating attention, visuospatial classification and working memory in order to make correct choices. They must also apply their response inhibition skills in order to avoid violating the target rule order and selecting an incorrect target. An individual's ability to complete the two tests quickly will also depend on their ability to sustain their attention and their overall central processing speed. Impairments in either selective attention and/or working memory in combination with visuospatial sequencing or response inhibition deficits will typically result in sequential errors. Perseverative errors on Test B will primarily occur due to deficits in and individual's alternating attention, visuospatial classification and/or working memory. Since any type of error requires that the test taker temporarily stop and start again from the last correct target selected, errors always result in longer test times.

The ECQ scale is a measure of executive control based on the Attention Control Quotient (ACQ) and the Cognitive Flexibility Quotient (CFQ). The ACQ and CFQ scale interpretations provide the necessary detail to help examiners in ascertaining an individual's strengths or weaknesses that result in either low or high test scale scores. In addition, the differences between these two scales can be used by the examiner to help identify specific skills that need to be remediated when deficits are identified. Thus, the ECQ is a composite measure that takes into account a person's basic attentional functioning when initially faced with having to quickly complete a novel task and combines it with their performance on a significantly more challenging test that specifically requires working memory, alternating attention and visuospatial classification. In the interpretation of the ECQ examiners will need to keep in mind that, in some cases, a very slow reaction time on both Test A and Test B may indicate underlying neurological problems. People can also be challenged by the demand to effectively utilize the additional cognitive skills required by Test B. Impairments in the ACQ and CFQ can also result from emotional, psychological, and learning disorders. Slow CFQ test completion times can occur for a number of reasons not specifically related to cognitive impairments, including confusion, anxiety, or emotional stress. In these types of situations the examiner

will need to carefully observe the test taker and clinically evaluate the specific reasons other than cognitive impairments that may contribute to poor test performance.

The test was taken on 11/9/2016 04:02 PM. It was administered on the same day as the IVA-2 Test. It was not known if this individual was on medications that could affect her performance on the MeSA-AE Test.

The research discussed in the manual pertaining to the test performance of individuals with different intellectual abilities identified the need to make adjustments to their test completion times for the MeSA-AE test. This adjustment is only made for adults (i.e., individuals 18 years or older). Since a person's IQ score is not often available, this adjustment needs to be made based on a person's education level which is generally reflective of their overall intellectual abilities. This correction is necessary in order to accurately calculate a person's attention control and cognitive flexibility quotient scores, but it is not possible to make this correction unless the individual's education level is specified. Individuals who have a higher level of intellectual functioning typically have lower test completion time scores. Likewise, the research supports that test completion time scores are higher for individuals with lower intellectual and education levels. Using this adjustment to an individual's test scores makes it possible to compare them to the appropriate normative data set in order to accurately identify cognitive strengths and weaknesses that take into account their education level. An adjustment was made to the completion time of the MeSA-AE test scores in order to take into account this person's education level. This individual completed one or more years of graduate studies and an adjustment was made to her MeSA-AE test scores taking into account her education level and intelligence.

She validly completed Test A in 36 seconds and had an ACQ scale score of 81. She also validly finished Test B in 108 seconds which resulted in a CFQ scale score of 61. The time it took her to complete both of these tests was 144 seconds and her ECQ scale score was 57 which showed that her executive control abilities were in the extremely impaired range.

This individual was found to have major deficits in her overall executive control capabilities. Her extreme level of cognitive dysfunction strongly indicates that she has a number of significant cognitive deficits which will impair her functioning. Given that her performance on Test A fell in the mildly impaired range, her ACQ score indicated that some of the cognitive problems which impair her executive control functioning include specific deficits in selective attention, visuospatial sequencing, sustained attention and/or central processing speed. Even though she has extreme impairments in her global executive control her ability to start and complete her required work in the home or work settings is likely to be only an occasional issue when she is required to do simple tasks. She may though have some difficulty at times maintaining her focus and getting her work done quickly, but for straight forward tasks her potential problems are likely to be fairly minimal. It is when she is faced with more complex and difficult work in the home or work environments that the extreme deficits in her executive control abilities will become evident.

Her cognitive flexibility functioning fell in the severely impaired range, Thus, her CFQ scale score showed that her very limited executive control functioning resulted from significant deficits in her visuospatial classification, working memory, problem solving and/or alternating attention cognitive skills. It would not be unusual for her to become easily frustrated or have other problems regulating and controlling her emotions. Her ability to think on her feet and use her working memory skills in order to perform work tasks will generally be observed to be significantly impaired. In addition, problem solving

skills along with the adaptability often required to meet work or social challenges would be expected to be an area of concern for her. Appropriate accommodations or interventions to address these areas of concern are strongly recommended in order to help her.

In order to better understand this individual's strengths and weaknesses it is useful to compare her overall visual IVA-2 attentional functioning with her capabilities identified by the MeSA-AE in attention control and cognitive flexibility. The IVA-2 **Visual Attention Quotient** (VAQ) provides a global measure of her abilities to be alert, focused and quick. This individual's quotient score on this IVA-2 measure of visual attention was 101 (PR=54) and it fell in the average range. In comparison her MeSA-AE **Attention Control Quotient** (ACQ) score was 81 (PR=10) and her **Cognitive Flexibility Quotient** (CFQ) was 61 (PR=1).

Her IVA-2 test results revealed that her visual attentional functioning fell in the average range. In contrast, her cognitive flexibility was found to be significantly impaired. Her MeSA-AE CFQ scale score showed that her cognitive flexibility was in the severely impaired range. While she clearly demonstrated strengths in her visual attentional functioning, she was found to have specific problems involving alternating attention, visuospatial classification, and working memory. Given that her MeSA-AE ACQ scale score fell in the mildly impaired range, it appears that for those tasks that require the cognitive skills of visuospatial sequencing and central processing speed this individual will have some difficulty in completing them. This individual's test results also indicated that she has additional problems pertaining to deficits in cognitive flexibility skills related to visuospatial classification, alternating attention and working memory. Her strength in visual attention functioning identified by the IVA-2 test for many tasks is likely to help her compensate for her executive control deficits. Work or assignments that require higher level executive control skills will tend to challenge her. These cognitive flexibility deficits will limit her ability to perform successfully in both social and work environments despite her good visual attention skills. Specific accommodations for her executive control and attention control problems will need to be considered by the examiner in order to help her.

### **IVA-2 DIAGNOSTIC CONSIDERATIONS**

These test results do not provide the examiner with support for the consideration of the diagnosis of ADHD. No significant impairment was found in respect to this individual's overall response control, attentional functioning, or ability to sustain her attention based on all the global IVA-2 quotient scale scores. However, if the individual has specific symptoms or complaints that need to be addressed, then the examiner may want to consider obtaining further medical or psychological evaluations. Based on these evaluations, other medical diagnoses or mental disorders could then be considered.

I have reviewed this interpretive report and have modified it as necessary in accordance with my comprehensive evaluation, the client's history and other relevant clinical data.

John Q. Public, Ph.D.  
Clinical Psychologist