**ASSESSMENTS & EVALUATIONS**

**Common Neuro Assessments by Domain:**

* Intelligence - WAIS, WISC, SB, TONI
* Achievement - WJ-III, WIAT, WRAT
* Attention - CCPT, WCST, Vanderbilt, NEPSY
* Language - GORT, Boston Naming, HRB-Aphasia
* Memory and Learning - WMS, WRAML, CVLT, RAVLT, ROCF, NEPSY
* Motor Control - Grooved Pegoard, Finger Tapping, Grip Strength, Lateral Dominance
* Visual-Spatial - ROCFT, Bender-Gestalt, HVOT
* Autism - ADOS, ASDS, ADI, GARS
* Executive Functioning - WCST, BRIEF, EFSD, D-KEFS, HRB
* Behavioral - BASC, Achenbach, Vanderbilt
* Adaptive Behavior: ABAS, Vineland

**General Cognitive Ability**

Measures of general cognitive ability, also known as IQ tests, evaluate the child’s ability to:

* solve visual problems,
* understand and use language,
* answer questions,
* construct block designs,
* compare visual patterns,
* evaluate how fast a child/adolescent can process visual information, and
* evaluate working memory.

IQ measures provide an overall score of ability.  Most measures also provide scores as to the child’s verbal skills and visual-spatial ability.  Some provide additional scores in working memory, processing speed, and learning ability.

IQ can vary over time for children who have experienced a medical difficulty.  Typically, IQ is stable after the age of 8 in healthy children.  Children who have had concussions, traumatic brain injuries (TBI), cancer treatment, and transplants often will show lowering of overall ability.  For this reason, serial evaluations are important in order to determine the child’s functioning and continuing intervention needs.

IQ tests are developed for different ages.

**The Wechsler tests** are developed for 3 different ages:

1. preschool and primary (ages 3-7)
2. school-age (ages 6-16)
3. adult (ages 16-89)

**The Differential Abilities Scale-2** (DAS-2) has 2 forms; one for children aged 2 years 6 months to 5 and another for ages 5-17.

**The Wechsler** and **DAS scales** also have scales that can be computed that measure solely nonverbal ability.

The **Kaufman Assessment Battery for Children-2** (K-ABC2) is a measure for a child that is meant to be administered with less emphasis on timing and language.  The KABC2 also provide a nonverbal scale as well as general ability scales.  These are the main measures of IQ that are used in general practice.

The **Stanford-Binet Intelligence Scale 5** can be used but is weighted on language for school-age children.

The **Comprehensive Test of Nonverbal Intelligence** (C-TONI), the **Leiter International Scale of Intelligence**, and the **Universal Nonverbal Test of Intelligence** (UNIT) are measures that do not rely on language and are used with children whose first language is not English.

**Attention**

Attention is an important area for evaluation because if a child has attentional problems, he/she may struggle on all of the other measures.  Attention is often evaluated through clinical interviews with parents and teachers as well as the completion of behavior rating scales.

There are many behavior rating scales that are used.  Some scales ask questions about attention as well as other aspects of behavior and emotional adjustments (**Behavior Assessment System for Children-2**; **Child Behavior Checklist**).  Others solely ask about attention (**Connors-3**; **Vanderbilt scales**; **Brown ADHD** scales).

Most of these measures are available for parent and teacher completion and some have self-report versions.

In addition to behavior rating scales, there are continuous performance measures.  These measures require the child to be in front of a computer and click a switch for a selected target and resist clicking to a nontarget.  Some of these include:

* Test of Variables of Attention
* Gordon Diagnostic System
* Connors Continuous Performance Test
* Visual and Auditory Continuous Performance Test

All of these provide some information about the child’s ability to pay attention to a long and boring measure.  Most of these measures have auditory and visual versions.

These tests, by themselves, cannot diagnose an attention deficit hyperactivity disorder.  Such a diagnosis requires careful interviewing and observation of the child in more than one setting.  In addition, behavior rating scales from caregivers and teachers are an important part in these diagnoses.

**Executive Functions**

Executive functions are those abilities that illustrate how a person solves a problem rather than just what is solved.  Executive functions include skills such as:

* planning and organization,
* working memory,
* the ability to inhibit responding,
* flexibility in thinking

Executive functions differ depending on age with younger children showing fewer executive abilities.  By mid to late adolescence most of the skills should begin to be evident.  Adolescents who have ADHD will often show difficulty with executive functioning.

Organization and planning are areas of difficulty for many adolescents but are particularly present for those with ADHD or who have experienced a traumatic brain  injury (TBI) or treatment for cancer and/or a brain tumor.  These areas can also be difficult for children with seizure disorders.  For that reason it is important to not only evaluate these skills but to acquire information from parent and teachers.

Direct measures include the **Delis-Kaplan Tests of Executive Functioning** (D-KEFS), the **Wisconsin Card Sorting Test**, and the **NEPSY-2**.  These measures consist of several subtests that evaluate inhibition, organization, planning, and working memory.

A behavior rating scale that can be completed by parents and teachers is the **Behavior Rating Inventory of Executive Functions** (BRIEF).  This rating scale evaluates the same areas that the **D-KEFS** and **NEPSY** but from the point of view of what is observed in the child’s everyday life.

In many cases the child will be able to complete the tasks on the direct measures because he/she is in a quiet room with direct feedback being provided.  It is not uncommon for the **BRIEF** to illustrate difficulties in application of skills.  It is important to evaluate whether the child *has* the skills and can’t apply them or whether he/she doesn’t know how to complete these types of tasks.  Interventions will differ depending on the answer to this question.

**Learning and Memory**

Learning and memory are important aspects of a child’s life.  In this case we are not referring to academic knowledge but rather how the child learns new material and then retains it.  Memory tasks are impacted by attention so it is important to recognize that if something isn’t paid attention to, it will not be recalled.  The **California Verbal Learning Test-Children’s revision**, **Test of Memory and Learning-3**, and the **Wide Range Assessment of Memory and Learning-2** for children as well as the **Wechsler Memory Scale IV** and others are commonly used measures.

Memory tasks are divided into auditory and visual modalities.  For the auditory tasks a child is often asked to learn a list of words and repeat what they can recall.  The list is read to the child more than one time so that it can be determined whether the child profits from repetition.  Most of these types of list learning also have a break in time of about 20 minutes.  After that time, the child is again asked to list what words he/she can recall.  In many cases, there is a recognition component where the child is asked if certain words are on a list or not.  Other types of auditory memory involve listening to a story and repeated it back, or learning a pair of words and recalling them over time.

Visual memory tasks show pictures, dot arrays, and designs and ask the child to point to the pictures previously seen, touch the dots in the same sequence, or draw designs from memory.  Visual memory tasks are not as reliant on language but are impacted by attentional problems.  They can also be negatively affected by motor difficulties.

**Language**

Language abilities are often evaluated in a neuropsychological assessment but are more fully evaluated by a speech and language pathologist, either privately or through the school.  Neuropsychologists may sample language abilities to screen whether there are areas of concern prior to referring to the appropriate specialist.

Language skills are divided into two major areas: receptive language and expressive language.

Receptive language develops first and is higher than expressive skills.  Receptive language is the ability of the child to understand what is being said to him/her.

Expressive language is the ability to tell or express one’s thoughts.  Within both of these types of language skills are also pragmatic language abilities.  These are abilities to understand the abstract nature of what is being said as well as the intent.

**Visual-Spatial Skills/Fine Motor**

Visual spatial skills often require the child to copy more complex geometric figures.  In some cases the figures are presented in a grid (**Developmental Test of Visual-Motor Integration**) or on cards that the child copies onto a larger piece of paper (**Bender-Gestalt 16est**).

One of the difficulties with these measures is the reliance on motor skills.  In order to determine whether motor is the difficulty or whether there is a problem with visual-spatial reasoning, it is important to measure fine motor skills as well as tasks that are relatively motor-free.

The **Purdue Pegboard** requires the child to quickly place pegs in a pegboard first with the dominant hand, then with the non-dominant hand, and then with both hands together.  Age norms are provided to determine how the child’s fine motor skills are developing.  The **Judgment of Line Orientation Task** requires the child to look at an array of lines and match two lines that are presented to the array.  This task does not have a motor component.

By utilizing these two types of tasks, it is possible to determine whether a motor difficulty underlies the child’s difficulty in copying or writing.  If so, a referral to an occupational therapist is appropriate.

**Adaptive Behavior**

Adaptive behavior skills are those that allow one to function in everyday life.  To that end, most measures are completed by the parent with some also completed by the teacher and are normed for the child’s age.  The areas assessed include:

* communication *(answering the phone, using computers, getting one’s needs met, ordering in a restaurant),*
* activities of daily living *(hygiene, household tasks, understanding how to manage money and time),*
* socialization *(the ability to make and keep friends, approach others, act in socially appropriate ways, and to attend social events)*,
* gross and fine motor abilities *(for children under the age of 6)*, and
* work ability *(for adolescents).*

Adaptive behavior involves executive functions as well as ability.  Children and adolescents who have an intellectual disability will score poorly on these measures.  A child cannot be diagnosed with an intellectual disability solely with an IQ below 70.  Adaptive behavior must also be assessed at that level.

**The Vineland Adaptive Behavior Scales-2** and the **Adaptive Behavior Assessment System** are examples of adaptive behavior measures. Both assessments can be completed by teacher and parents.

**Behavioral and Emotional Functioning**

A clinical interview of the parents and child is the most appropriate method for evaluating a child’s behavioral and emotional functioning.  Questions may include:

* How is the child’s mood most of the time?
* What is frustrating for the child?
* How does he/she handle frustration?
* What types of intervention have been attempted?
* What has been successful in working with the child?

Individual interviews with the child and adolescent can also center on these areas. In some cases a child may be forthcoming, while others may be reluctant to share feelings and thoughts.  Observation of the child is an important part in evaluating the child’s emotional functioning.  For example, how he/she reacts to the examiner is as important as the tasks that he/she is asked to perform.

**Social Skills**

Social skills are evaluated through parent and teacher questionnaires and observations.  In addition, there are some rating scales that can provide insight into how the child relates to others.

The **BASC-2** (discussed above) evaluates social skills as well as behavioral and emotional functioning.  In addition measures such as the **Social Communication Questionnaire** and the **Social Responsiveness Scale** can provide information as to the child’s day to day social functioning.

**Academic Ability**

Academic skills are screened during a neuropsychological evaluation.  This area of assessment is often accomplished by the school psychologist.  Insurance companies are reluctant to reimburse for academic assessment so make sure that it is inquired about at the assessment or when discussing payment.

There are many academic measures that are used.  Two examples include **The Woodcock-Johnson Achievement Battery-IV**and **The Wechsler Individual Achievement Test-II**.  These measures evaluate overall reading skills, mathematics, and written language.  Scores on these measures can be compared to that of the IQ tests.  A significant discrepancy between ability and achievement is considered a possible sign of a learning problem such as dyslexia in reading and should be further evaluated through the school.