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Neurological Testing: A Contemporary Overview of Part of the Psychiatric Examination with a Focus on the Bender Gestalt II

Michael F. Shaughnessy

Eastern New Mexico University, Portales, New Mexico.

Michael.Shaughnessy@enmu.edu

***Corresponding Author:** Michael F. Shaughnessy, Eastern New Mexico University, Portales, New Mexico.*

Abstract

This paper provides a brief overview of some of the tests utilized in a neurological screening or full neurological battery. It is not intended to be a full comprehensive review of all of the tests, but to alert clinicians, and other professionals as to some of the options and alternatives available. A focus will be on the Bender – Gestalt II as part of a psychiatric intake.

Introduction

The field of neurology, neurological testing, and neuro-psychological rehabilitation has grown rapidly over the past few decades. Training for clinicians, however remains scant and the daily practitioner needs to know a good deal about the components of a neurological screening and full battery. Any competent clinician is going to attempt to evaluate many of the following components. This paper will cursorily review the literature and the main components of a neurological examination, focusing attention on visual spatial processing and screening, with special emphasis on the recently revised Bender Gestalt II

Global Domains

Attention and Concentration

In order to rule out attention deficit disorder or hyperactivity or impulsivity, and to ascertain the individual's ability to focus, attend, and concentrate on the task at hand and to deal with distractions.

Verbal and visual memory

Clinicians need to ascertain how well the client is able to follow verbal directions, interventions and prompts as well as how well they are able to remember what they see particularly if they are enrolled in a college or high school or graduate level class.

Auditory and visual processing

Being able to grasp verbal directions, verbal suggestions and processes requests in the auditory channels is imperative in certain vocational realms, while visual processing, is important even in the most simple of tasks such as driving and operating a motor vehicle.

Visual-spatial functioning

Activities of daily living require a number of visual spatial skills to perform routine tasks- such as emptying the dishwasher, cooking, cleaning, vacuuming and the like.

Language and Reading skills

These two areas are somewhat linked, yet in many clinicians perspectives, two separate realms. For the speech language pathologist, the examination of both expressive and receptive language skills is paramount. For the school psychologist, evaluating a person for dyslexia or some reading difficulty, the process is more intricate and complex and a variety of reading tests and measures need to be employed. An informal reading test may be followed by a very complex test such as the Woodcock Johnson Reading Test, which may analyze antonyms, homonyms, synonyms, reading rate, reading comprehension and reading fluency (perhaps as measured by the Nelson Denny) and other realms.

Gross and fine motor development

particularly in the realm of vocational rehabilitation, it is imperative for clinicians to be aware of the skills, or lack there of in the gross and fine motor realms. Vocational Rehabilitation counselors have a plethora

of tests to evaluate and assess and measure these skills, that a neuropsychologist may not have.

Social Skill Development

For many individuals who have suffered some type of head injury, brain trauma, brain cancer or other insult to the brain, social skills, interpersonal skills and the like are often quite impacted. It is important to take a long hard look at the individual's social skills before and after an accident or trauma.

Executive Functioning

Planning, organization and attention are skills that are predominately impacted by damage to the frontal lobe of the brain. This is a relatively new realm, but there are tests of executive functioning that are available.

Emotional and Personality development

Some patients and clients present with anxiety, depression, fears, tensions, stemming from an automobile accident for example, and others are somewhat fixated at some stage or personality development.

Assessments that may be used by Domain

Intelligence

Wechsler Adult Intelligence Scale, (WAIS) Wechsler Intelligence Scale for Children- 5th Edition, Stanford Binet 5, the Test of Nonverbal Intelligence(TONI) and the RIAS-II (Reynolds Intellectual Assessment Scale-II) are all part of a comprehensive neurological battery. There are other alternative assessments such as the Kaufman Assessment Battery for Children-Second Edition.

These tests often provide initial clues and cues as to areas of concern and specific areas of weakness. Almost all tests of intelligence have some sort of memory assessment - short term, and working memory in some instances. Observant examiners can observe for gross and fine motor problems, inattention and speech and language difficulties or deficits.

Achievement

Woodcock Johnson - III, Wechsler Individual Achievement Test, Wide Range Achievement Test-4, and the Kaufman test of Educational Achievement-II are all tests which provide a global assessment of academic achievement. Some tests are more in depth than others, such as the Peabody Individual Achievement Test which has a general information subtest, and a written expression subtest and provide different amounts of information, depending upon the referral reason.

Attention

There are now a few computerized tests such as the TOVA- (Test of Variables of Attention, which allow for clinicians to ascertain if the patient/client has difficulty in visual attention or auditory attention. One other test that is typically given to athletes is the Impact which is given before the season begins, typically to football players and the results are kept in the program to ascertain status post concussion. CCPT is the Connors Continuous Performance Test, now in its second edition. This computerized test is extremely well standardized and utilized and has extensive research regarding its use. Comprehensive information can be found at http://www.devdis.com/conners2.html

Language

The main two tests in this realm are the Peabody Picture Vocabulary Test- 4th Edition and the Expressive One Word test, now in its second edition. These tests provide an excellent picture of the client's receptive and expressive language.

Memory and Learning

The Wechsler Memory Scales are an excellent stand-alone assessment, although clinicians will begin to infer strengths and weaknesses (long, term, short term memory) from most individually administered I.Q. tests. The California Verbal Learning Test (CVLT) is perhaps one of the most used neuropsychological tests in the United States. It is a fairly new approach to neuro and clinical psychology and memory assessment. It provides a measure of episodic verbal learning and memory. Further these tests seem to show sensitivity to a variety of clinical conditions. The instrument test does this as it attempts to link memory deficits with specific impaired performance on very specific tasks. It evaluates encoding, recall and recognition in a mode of item presentation (auditory-verbal). The CVLT is thought to be a much more sensitive measure of episodic memory than other tests of verbal learning. It's specific purpose was not only measure the quantity of material a client or patient has learned but also to indicate the specific strategies they utilized and lastly, the types of errors made.

The CVLT is unique in that it attempts to measure a) free and cued recall, b) serial position effects (specifically including primacy and recency), c) semantic clustering, d) intrusions, e) interference and recognition.

Delis and co-workers (1994) released the California Verbal Learning Test for Children (CVLT-C). The California Verbal Learning Test-II (CVLT-II) is specifically an updated version of the original CVLT. That test had been standardized and in addition, provides normative data.

The Rey–Osterrieth test is a neuropsychological test which contains a number of very complex figures and the clients/patients are required to copy a very complicated line drawing. Initially they are required to copy it freehand (recognition), and then attempt to draw it from memory (recall).

There are many different and various cognitive abilities required for an exact or correct performance, and this assessment allows the evaluation of a number of different functions, such as visuospatial abilities, short term visual memory, immediate attention, planning, and working memory or what is termed executive functioning).

It was first developed by a Swiss psychologist named André Rey in 1941 and then later standardized by Paul-Alexandre Osterrieth in 1944. It is quite frequently used to examine and explore and explain any secondary effects of traumatic brain injury in neurological patients It is also utilized to evaluate person for possible dementia, or to examine and explore the degree of cognitive development in children and adolescents.

The Rey Auditory Verbal Learning Test (RAVLT) is an instrument that evaluates a very wide number of different functions including: short-term auditory-verbal memory, the person's rate of learning, their learning strategies, retroactive, and proactive interference (dealing with things that happen or occur before or after learning, the presence of confabulation of confusion in various auditory and visual memory processes, the retention of information, and specific differences between learning and retrieval.

Participants are given a list of 15 unrelated words repeated over five different trials and are asked to repeat. Another list of 15 unrelated words are given and the client must again repeat the original list of 15 words and then again after 30 minutes. Approximately 10 to 15 minutes is required for the procedure (not including 30 min. interval).

Motor Control

Grooved Pegboard, Finger Tapping, Grip Strength, Lateral Dominance are all tests that provide some gross information regarding the gross and perhaps fine motor skills of individuals referred for neurological screening

The Visual Spatial Realm

The Beery Butenika Test of Visual Motor Integration, the Hooper Visual Organization

Test and the Bender-Gestalt-2 are three of the most frequently used screening instruments, which are all fairly simple to give, easy to score and can be a rapid assessment for busy clinicians. The Beery VMI is now in its 6th edition. Updated norms are available for children and adolescents 2—18 years of age. Adult norms are available, but have not been updated. There are however, various reports of advances in various realms- medical, neuropsychological, of recent date. More information can be gleaned at https://www.mhs.com/MHS-Assessment?prodname=beeryvmi6

The Beery Butenika Test of Visual Motor Integration has been revised several times and is a highly structured assessment, wherein students or clients are asked to reproduce designs (circle, square, triangle, diamond etc.) immediately below the stimuli. This can be given to children 2 years of age and up and takes about 10-15 minutes to administer. Many clinicians prefer the Beery to the Bender as it is more structured and provides more of an opportunity to see sequential growth problems or concerns such as difficulty with angulation, than other less structured tests.

The Hooper Visual Organization test "Assesses neurological impairment through a quick measure of visual integration, relatively unaffected by situational factors" and can be used for individuals ages 5 and up. Administration time is less than 15 minutes and the subject is asked to identify 30 distinct different objects which are seen in drawings as puzzle pieces. T-scores and cutoff points are provided. Information is available and this information has been taken from the following website: https://www.wpspublish.com/store/p/3081/vot-hooper-visual-organization-test

The Bender Visual Motor Gestalt Test is now in its second edition. It has been recently revised by Gary G. Brannigan and Scott Decker and this revision now includes several new aspects to the test, specifically abit more basal and ceiling. The stimulus cards come with a very extensively revised manual with clear, exact specific directions for the scoring and administration of the test. The manual does contain specific directions for the copy phase, and the recall phase, and also the specific directions for the Bender Gestalt II Motor Test and the Perception Test. The manual contains detailed standardization and norming information, as well as technical properties, interpretation and standard score equivalents as well as additional standardization statistics are provided.

The manual also contains a brief introduction to the test and a brief historical background, and some information regarding the test design and it's development, and technical properties and interpretation. The Bender-Gestalt II is an update of a classic assessment, the Bender-Gestalt, developed by Loretta Bender. It continues its traditionas a brief test of visual-motor integration that may provide interpretive information about an individual's development and psychological functioning. The Bender-Gestalt II assessment is clinician-administered. The patient reproduces Gestalt figures presented on stimulus cards. This assessment is suitable for individuals three and older. This test uses new recall procedures to assess visual-motor memory and provide a more comprehensive assessment of visual-motor skills. The Bender-Gestalt II includes supplemental tests of simple motor and perceptual ability helps identify specific visual-motordeficits. This test can also be used to assess neurological damage and emotional disorders.

Piotrowski (2016) has reviewed 30 studies utilizing the Bender Gestalt II worldwide. Piotrowski clearly indicates that the Bender Gestalt is "used moderately in neuropsychological assessment" (p. 73) It has predominately been utilized by school psychologists as a psychoeducational measure. However, while there is ample use of the Bender Gestalt II in vocational rehabilitation, (Donoso, Hernandez, & Horin, 2010) with children born pre-term (Bohm, Lundequist, Smedler, 2010) in regards to their visual motor and executive functions, forensic use (Lees-Haley, Smith, Williams and Dunn,1996) and dementia (Murayama, Iseki, Yamamoto, Kimura, Eto, & Arai (2007) and some research with the Bender Visual motor Gestalt test in adolescents- examining the relationships between the Tanner stages and visual motor development (Keppeke, Cintra, & Schoen, 2013) scant research has been done examining the newly revised Bender in terms of neurological screening.

Brannigan and Decker (2006) reviewed the process by which the original Bender was revised, modified and extended. Clinicians who use the Bender for developmental screening, and assessment are aware of the extensions and opportunities for more in depth study of visual memory and visual processing.

Brannigan and Decker (2006) quite specifically indicated that the publication of this revision of the Bender would "stimulate further research in the following areas: diagnosing organic pathology, predicting school learning problems and assessing personality dynamics and psychopathology" (p. 12) Sadly, as one reviews the existing literature, not a great deal has been done in any of these realms.

Brannigan, has further given extensive information regarding the re-standardization/renorming of the test and discussed it in general (Brannigan and Shaughnessy, 2013).

The Bender Gestalt II, combined with the K-SNAP (Kaufman Short Neurological Assessment Procedure) is an ideal combination for immediate quick screening. The K-SNAP was developed by Alan S.and Nadeen L. Kaufman and is intended for students from ages 11 through 85 and older. The screening measure takes about 30 minutes to administer and provides 3 subtest scores and two composite scores as well as a descriptive category for mental status. The subtests, Gestalt Closure, Number Recall and Four –Letter Words subtests(as well as Recall and Closure composite) provide scaled scores with a mean of 10 and a standard deviation of 30 as well as percentile ranks and descriptive categories. There is a composite score with a mean of 100 and standard deviation of 15. This brief, individually administered measure takes about 30 minutes to administer

McDonald, Volker, Lopata, Toomey, Thomeer, Lee, Lipinski, Dua, Schiavo, Bain and Nelson (2016) have conducted research with both the Bender Gestalt II and the VMI-VI in the identification of HFIASD (High Functioning Autistic Spectrum Disorder) and compared and contrasted typically developing youth and HFASD children.

Volker, and his colleagues (2010) compared the Bender Gestalt II and VMI V in samples of typical children and children with high functioning autism spectrum disorders.

Bozorgpour, Rahimi and Mohamadi (2016) used the Bender Gestalt II to assist in the differential diagnosis of depressed patients, brain damaged and normal subjects. Thirty major depressive patients were compared to 30 brain damaged and 30 normal subjects. The results indicated that the BGT-II could differentiate the patients groups from normal. Normal subjects did better in all three phases- copying, recall and perceptual/motor phases.

Autism

There are several tests and rating scales used to differentiate head injury/brain damage from autism. The ADOS is the Autism Diagnostic Observation Schedule which is a test/rating scale that allows practitioners to validly and reliably assess and possibly diagnose autism and pervasive developmental disorder or delay when administered along with a comprehensive developmental history. It is utilized for toddlers to adults and takes approximately 30-45 minutes to administer across several ages, and developmental levels minutes. It is a basic standardized behavioral observation and yields certain scores for tentative diagnosis of autism or at earlier ages for pervasive developmental delay or disorder. This was published in the year 2000, so it may be due for a revision. This is available in Danish, Dutch, Finnish, French, German, Hebrew, Hungarian, Icelandic, Italian, Korean, Norwegian, Romanian, Russian, Spanish, and Swedish, thus has world-wide usage.

The GARS-3 (Gilliam Autism Rating Scale) is a well-known scale, which is now in its third revision. This scale is believed to assist teachers, parents, psychologists, clinicians and mental health workers in screening for autism and for approximating its severity. There are six distinct sub-scales that have been empirically evaluated to be sensitive and valid and relevant for the identification of pre-school and nursery children with possible ASD. There are fifty six items which describe the various behavioral traits and characteristics of students with autism. These six sub-scales are: Restrictive, repetitive behaviors, Social Interaction, Social Communication, Emotional Response, Cognitive Style and Maladaptive Speech. The specific test-retest reliability coefficients exceed. 80 for the various sub-scales and .90 for Autism Indexes.

The Realm of Autism

The CARS (Childhood Autism Rating Scale) is now in its second edition, so it is now termed the Childhood Autism Rating Scale 2 or CARS 2. It is authored by Eric Schopler, PhD, Mary E. Van Bourgondien, PhD, Glenna Janette Wellman, PhD, and Steven R. Love PhD and is considered to be a good very brief rating scale that facilitates the identification of autism in children and adolescents. Examiners need to be well trained and competent and this scale can be used from age 2 onward and this instrument is useful for Response to Intervention levels 1 (for initial identification and) level 3, intensive treatment, goal setting and the like. Administration format is paper and pencil and completion time is estimated to be approximately 15 minutes for the 15 items on the test. Scoring is done by hand. This recent revision was done in 2010.

Executive Functioning - The WCST, (The Wisconsin Card Sorting Test) has been utilized for over four decades for prefrontal functioning. Nyhus and Barcelo (2009) have reviewed the use of this test with Neuroimaging studies, and reviewed clinical studies using this measure. The BRIEF is The Behavior Rating Inventory of Executive Function and is regarded as an assessment of various executive function behaviors that are observed at home, and in the school setting for pupils from ages 5–18. This was originally developed by the following individuals: Gerard Gioia, Ph.D., Peter Isquith, Ph.D., Steven Guy, Ph.D., and Lauren Kenworthy, Ph.D.

This 86-item questionnaire has different forms for caregivers/parents and instructors, and generally takes about 10–15 minutes to administer and approximately 15–20 minutes to score. There are other versions of this test that are available for preschool children aged 2–5 (BRIEF-P), and also self-reports for adolescents who are in the age range of 11–18 (BRIEF-SR). Lastly, there are self/informant-reports of adults from ages 18–90 (BRIEF-A).

EFSD is a global overview of the various realms and domains that need to be evaluated in a neurological examination. It can be found at this site: https://quizlet.com/71338775/esfd-clems-nuerologic-assessment-flash-cards/

D-KEFS is the Delis-Kaplan Executive Function System™ which was developed by (D-KEFS™) Dean C.

Delis, Edith Kaplan, Joel H. Kramer, for individuals 8-89 years of age. This is appropriate for the evaluation of basic components of executive functions in the verbal and spatial modalities. It is used for RTI (Response to Intervention) Tiers 2 and 3 and completion time varies depending on the various subtests selected:

The entire battery is thought to take approximately 90 minutes. This instrument has been normed on more than 1,500 individuals matched demographically and regionally with the U.S. population Behavioral – BASC-2 The Behavior Assessment System for Children is now in it's second edition and provides in depth information regarding the child's behavior and cognition. An excellent summary, combines with a video can be found at: http://basc-2.szapkiw.com/basc-summary/

Serious clinicians interested in an in depth assessment of children's behavioral issues would do well to review the vast amount of information regarding this test developed by Cecil Reynolds and Randy Kamphaus.

CAB(Clinical Assessment of Behavior) is primarily for school aged children and asks both parents and teachers to fill out a 5 point Likert Scale, which will then be computer scored and a report will be available.

The CAB has a Teacher Rating Form (CAB-T) with 70 items, a Parent Rating Form (CAB-P) with 70 items and a Parent Extended Rating Form (CAB-PX) with 170 items. There is an extensive professional manual that accompanies this measure (Bracken and Keith,2004). There are clinical scales measuring internalizing and externalizing behavior, adaptive scales (social skills, competencies) and a clinical cluster area (anxiety, depression, anger, aggression, bullying, conduct problems, attention deficit hyperactivity, autism spectrum behaviors, learning disabilities and mental retardation (now intellectual deficiency). With several pictorial representations and printouts, this measure quite quickly and clearly can help school psychologists focus on areas of concern.

Mental Status Exam

The Mental Status exam, is typically conducted early on in the process to as certain if the individual is oriented in all three spheres. The clinician is interested to discern if the individual knows the current day, date, time, place and president. There are standardized mental status examinations, and then there are more informal mental status exams, depending on the location (emergency room or clinic) of the assessment.

Screening Tests of Neuropsychological Skills

The Dean-Woodcock Neuropsychological Battery (DW) is probably the most accessible comprehensive assessment of sensory-motor functioning available. This test includes first, a structured interview, secondly, a sensory-motor battery, and lastly an emotional status exam to discern any outstanding emotional issues. The Dean Woodcock allows for an expanded range of assessment and the manual and provides very standardized procedures and specific normative information. Many other measures areless well developed in this regard.

The Dean Woodcock Neuropsychological Battery is an alternative to the Halstead-Reitan Neuropsychological Test which attempts to evaluate the following domains: a) Verbal skills b) Spatial and sequential perception c) the patient/client's ability to form mental concepts, and analyze information, and make reflective judgments d) their motor output e) his or her Attention f) their Concentration g) memory and lastly their tactile abilities.

Summary and Conclusions

This paper has attempted to provide an overview of some of the most frequently used tests for formal and informal assessment of neurological impairment. It is by no means exhaustive, but has focused on a test that deserves more scrutiny in terms of its usefulness-the Bender-Gestalt II. The existent literature has been cursorily reviewed, and the need for future research with various populations has been indicated.

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