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Review Article

The Wechsler Intelligence Scale for Adults- 4th Edition and the Bender Gestalt-2: Two Revised Instruments Foundational to the Neurological Examination

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Abstract

Over time, various tests which are the foundation of any comprehensive neurological examination are revised. It is imperative that clinicians be aware of these new instruments and procure additional training and orientation to these tests. This paper will cursorily review the WAIS-IV and discuss this test and neurological implications as well as the recently revised Bender Gestalt II. This is simply a brief summary of these two newly revised instruments that form a small part of a comprehensive neurological examination.

Keywords: *Wechsler Intelligence Scale; Bender Gestalt-2; Neurological Examination*

A full complete, comprehensive neurological examination consists of a number of different elements.

Certainly, a history, a review of medical information, a mental status exam, and vocational and social history (marriage, family) are all integral parts of a robust comprehensive evaluation in order to respond to the referral reason. Two elements of any neurological often consist of an individually administered intelligence test as well as a visual motor test. Typically in the past, some version of the Wechsler scales have been used and the Bender Gestalt. However, both of these tests have been revised and it seems necessary to review both of these tests so that clinicians are not using anachronistic, outdated instruments. This article is not intended to train clinicians in these two instruments, but simply to review their usage.

Any neurological examination should include a full intelligence test- perhaps the Stanford Binet 5 or some similar instrument. The Wechsler Scales have a long history and these scales are often the foundation of any psychological, psychiatric and or neurological examination. The Wechsler Adult Intelligence Scale has been recently revised and is now in its fourth edition [1]. This section of the paper will review some of its components and indicate their relevance to the neurological evaluation.

The verbally oriented subtests will first be reviewed with some, but not all implications for those with head injury, brain damage or concussion. This is an entirely separate part of the neurological examination.

The WAIS-IV

This test provides four main areas- Verbal Comprehension, Perceptual Reasoning, Working Memory and Processing Speed. There is some overlap in terms of these tests- since they all rely on a certain amount of attention, cooperation and motivation from the client. There is a "Full Scale I.Q. provided in addition.

Verbal comprehension

In general, the subtests are administered in a certain standardized order. This paper will adhere to the order of the verbal subtests for clarity. The first verbal subtest is "Similarities". In this subtest, the subject is asked to indicate how two words, ideas or concepts are similar.

The questions begin in a relative simplistic manner- for example asking how a penny and a nickel are alike or how a banana and an orange are alike. Responses can be very simplistic (money, fruit) or extremely complicated (currency, means of exchange; both contain vitamins nutrients, proteins, minerals and are good to eat and are commonly found in grocery stores and both are fruit). Directly and indirectly, this subtest measures or assesses expressive as well as receptive language and indirectly auditory memory and concentration as well as freedom from distractibility. The questions, as one might surmise become increasingly more difficult and more abstract and complex, and the responses may reflect the client's head injury or indirectly their intelligence and concentration. The results of this subtest are also compared to the result of the other various verbal subtests.

Vocabulary: Vocabulary is a subtest known to correlate most highly with intelligence and we all utilize words and verbiage on an ongoing basis. The examiner asks the client to define, describe and indicate the meanings of some words. The words are initially quite simple (What is a penny, or nickel or dime?) but progress to more complex, intricate words (anachronistic, capitalism). The subject has to define these specific words and often their definition is written down verbatim for future review and analysis.

Vocabulary subtest is indirectly measuring one's expressive language skills and auditory reception skills as well as their general fund of word knowledge.

Information: Information is a subtest that measures general knowledge or world knowledge or what other refer to as encyclopedic knowledge. But as we traverse through life, we amass a good deal of general information-such as our date of birth, social security number and also current information such as the current President. As with all of the subtests, the questions are initially quite simple and progress to more complex intricate questions that may indirectly reflect one's college or even graduate education. Long term retrieval is being assessed and measured as well as long term memory.

Comprehension: Comprehension is a subtest that has been referred to as a type of common sense assessment, although many would suggest that it directly or indirectly measures emotional intelligence or social skills, or logical sequential thinking about the world. Indirectly the subject is based asked to make some value judgments about proper, appropriate, logical thinking, and values. Subjects who have difficulty with this subtest may have difficulty with concentration, expressive language, short term memory and could even be intellectually deficient (this would be seen in many of the other subtests also).

Digit span: Digit span is a secondary test that directly and indirectly measures one's short term memory, concentration, verbal reception and ability to receive stimuli from the outside world and respond accordingly. The subject is presented with various numbers and is asked to recall them, first in a forward manner, then backwards. Attention to stimuli, presented in an auditory manner is being assessed as is verbal short term memory. Many individuals with attention deficit disorder have difficulty with this and many individuals who may have some type of hearing loss also do not fare well on this test. Some individuals attempt to cope with the demands of this test by covering their eyes to shut out all outside stimuli. Again, one's scores are compared to others in the verbal realm. Patients with head injury may experience a great deal of exasperation with this particular subtest.

Perceptual reasoning

Block design: Block design has been a staple of many intelligence tests for years. Basically a design is shown to the subject on a card and the subject is asked to reproduce the design using the blocks. The designs are initially quite simple, but get progressively more difficult and complex. These are timed and care is taken to ensure that handedness is accounted for (this is a concern across all testing situations, as some individuals are indeed left handed, and examiners need to be sensitive to the administration of some subtests where handedness could be a factor). The examiner does demonstrate the elements of the test so that the individuals clearly understands what is required of them. This subtest measures visual motor skills, fine motor skills and visual integration, as well as motivation since the test is timed.

Matrix reasoning: In this subtest, the subject is asked to select an appropriate response from an incomplete series of items. While this is a visually administered subtest, obviously a good deal of cognitive though may go into the solution of these matrix presentations. There are sample items provided so that the subject clearly understands what to do.

Visual puzzles: A visual test that is timed, the subject is required to look at and select 3 responses that would complete the puzzle. This is a timed test and a sample item is provided. This requires multiple responses, so it is somewhat of a different challenge than simply providing a one word answer or responding to a multiple choice question, for example.

Figure weights (supplemental): There are a number of additional sub tests that may be given in the event that one of the other subtests is spoiled or disrupted for any reason. Often certain subtests yield important information. In other instances, they are thought to add little to the "big picture".

Picture completion: This subtest assesses, evaluates, measures an individual's ability to locate small, but often important details in a picture presented by the examiner. Many individuals do well in life as they often pay quite close attention to small details of importance or significance. Some of the early questions or stimuli are quite simple, but gradually the details of significance require close visual attention and examination. The examinee can point to the missing object or aspect of importance.

Twenty seconds is allowed. This subtest assesses visual scanning and indirectly response time to visually presented materials.

Working memory

Digit span is a secondary test that directly and indirectly measures one's short term memory, concentration, verbal reception and ability to receive stimuli from the outside world and respond accordingly. The subject is presented with various numbers and is asked to recall them, first in a forward manner, then backwards. Attention to stimuli, presented in an auditory manner is being assessed as is verbal short term memory. Many individuals with attention deficit disorder have difficulty with this and many individuals who may have some type of hearing loss also do not fare well on this test. Some individuals attempt to cope with the demands of this test by covering their eyes to shut out all outside stimuli. Again, one's scores are compared to others in the verbal realm. Patients with head injury may experience a great deal of exasperation with this particular subtest.

Arithmetic is a singular subtest, thought to obviously measure one's mathematical skills and ability to solve verbally presented problems. The problems however are presented verbally and require the individual to problem solve internally, although some of the early items simply ask the client to count items and some of the items are timed. Some individuals have greater difficulty with timed items than others. In a sense, when simplistic items are presented (Tommy has 3 balls, he loses one, how many does he have left?) one does not expect an adult to need five minutes to respond to such a question.

The examiner notes rapid response time and long response time, and this indirectly provides some information as to the examinees mathematical skills and brain functioning.

Letter-Number Sequencing is one additional subtest that requires a good deal of concentration, good auditory memory skills, and an ability to internally manipulate data. The subject is given a certain number of letters of the alphabet and numbers and asked to reiterate or repeat them in a certain sequential order.

All of the three above rely on memory, concentration, a keen sense of attention and focus. Examinees who do poorly may have had a previous brain injury or perhaps even a military wound or concussion.

Thus, the results of all of these tests should be taken in context with the history of the individual and with a comprehensive psychological and psychiatric as well as medical history, Letter number Sequencing (as described previously) is also used for Comprehension of oral directions as the examinee must grasp and understand the directions provided by the examiner.

Processing speed

The final realm to be assessed, and evaluated in this section of the paper is the area of "processing speed". In today's world, individuals must process, store and make sense of a great deal of information and grasp it quickly. College students and others involved in higher education are faced with an onslaught of information that has to be quickly read, understood and processed.

Symbol search: Symbol search is a visually oriented subtest in which the subject is presented with a number of " target symbols", for example-a * or a @ and then they are asked to determine if the same targets are in a search group that follows---such as 6, V, and,%, M, etc. This requires attention to detail, and obviously good vision, concentration and focusing skills. This subtest is timed and demonstration items are provided so that the subject clearly understands what to do. Obviously, the directions need to be clearly understood, so if a subject speaks another language as their primary mode of communication, this subtest may need to be altered (given in Spanish) or an alternative one administered. This issue bears repeating across the board. With an increasingly heterogeneous population in the United States (and literally around the world, it is imperative that examiners be sensitive to these issues across all subtests.

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Coding: This subtest has been incorporated in various children's, adolescent and adult tests literally over several decades. Basically, several symbols are linked or associated with various numbers and then the subject is asked to complete a template assessing the subject's ability to recall or re-check for accuracy the association of the number with the symbol. This test is also timed and indirectly measures motivation, visual scanning, visual memory, and specific, exact, precise attention to detail.

Cancellation: In this subtest, the subject is asked to attend to certain shapes and colors and then draw a line or "cancel out" similar figures of similar shapes and colors. There is some concern about individuals who might be color deficient, and also demonstration and sample items are provided so that the subject clearly understands what to do and what is required of him or her. This is another test of visual processing, ability to visually scan and remember materials and cope with novel, divergent types of situations and materials.

Following the administration of all of the subtests, the evaluator will score all of the subtests and write a comprehensive report and attempt to analyze all of the data- both the objective data, and the subjective data as well as the motivation of the client. Attention should be paid to certain specific issues- such as vision (was the subject wearing prescription lenses? A hearing aid? Was cerebral palsy or tremors noted?) and motivation should also be assessed. Pre-testing behavior and comments as well as during testing behaviors (repeated requests for water, to use the bathroom, requesting inordinate amounts of attention) should all be noted, as well as other factors (sex, age, ethnicity, etc.) be taken into account.

Competent clinicians should take all of the gleaned information along with a history and other relevant, salient information to form an opinion as to the present level of functioning of the individual. I.Q. test results however are only one part of a larger picture with other factors and variables being equally relevant- social skills, vocational skills, motivation and inter-personal skills.

The Bender Gestalt II

The Bender Gestalt II has recently been revised under the leadership of Gary Brannigan. They have added additional cards for an increased basal and ceiling. Brannigan and Decker have provided [2] a new Bender Gestalt II Examiner's Manual containing a wealth of data regarding validity, reliability and the testing of special groups. The actual test [3] is a test with a long history and exceptional use by a wide variety of clinicians for a wide variety of subject populations. Brannigan, and Decker [4] provided a preliminary review of The Bender Gestalt II in the American Journal of Orthopsychiatry and the test has been well received. Additional data and more information can be found in Brannigan and Shaughnessy [5] in " An Interview with Gary Brannigan: Revising the Bender Gestalt Test" in the North American Journal of Psychology.

The Bender Gestalt has a long history and Piortrowski [6] has documented the use of the Bender Gestalt Test worldwide as he reviewed 30 practice-based studies in the Journal of Projective Psychology and Mental Health. Interested readers are referred to this compilation for further information.

There has been some preliminary research on the Bender Gestalt II by Bohm, Lundequist, and Smedler [7] who examined both the visual motor and executive functions in children born preterm utilizing The Bender Visual Motor Test in the Scandinavian Journal of Psychology. Bozorgpour, Rahimi, and Mohamadi [8] examined the utility and usefulness of The Bender Gestalt Test II for the differential diagnosis of specifically major depressive patients, brain damaged and normal subjects.

McDonald, Volker, Lopata, Toomey, Thomeer, Lee, Lipinski, Dua, Schiavo, Bain, and Nelson [9] employed the VMI-VI (Visual Motor Integration) and BG-II (Bender Gestalt-II) KOPPITZ-2 for Youth with HFASDs (High Functioning Autism Spectrum Disorders) and Typical Youth.

Volker, Lopata, Vujnovik, Smerback, Toomey, Rodgers Thomeer ML [10] compared the Bender Gestalt-II and the VMI-V (Visual Motor Integration Test) in various samples of typical children and children with high-functioning autism spectrum disorders. This research published in the Journal of Psychoeducational Assessment seemed to attest to the usefulness of the Bender II.

Donoso, Hernandez, Horin [11] focused on the use of various psychological tests within the realm of vocational rehabilitation and career and occupational counseling. Keppeke Cintra, and Schoen [12] focused on the utilization of the Bender Gestalt II with adolescents and explored the relationship of visual motor development and the Tanner Stages. Nasab Salehi, Kafi Rezaei [13] specifically focused on the Bender Gestalt II in terms of it's usefulness with patients who have suffered a traumatic brain or head injury.

Shaughnessy [14] has reflected on the Bender Gestalt II as an underutilized tool in brief neurological screening in the Asian Journal of Neurology. Shaughnessy [15] has also focused on the use of the Bender Gestalt II as part of a brief psychiatric screening. Given that the Bender Gestalt II remains a brief, yet important part of any neurological assessment it is incumbent upon clinicians to familiarize themselves with the test and it's administration and scoring and relative use with various populations.

Conclusion

This paper has attempted to sensitize clinicians to the use of two revised instruments which form a critical part of any neurological screening- the WAIS-4 and the Bender Gestalt II. Some additional references for further study are provided and an overview of the subtests and their relevance in a neurological examination are discussed.

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