Assessment Critique: The Brain Injury Visual Assessment Battery for Adults

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**Brain Injury Visual Assessment Battery for Adults**

Mary Warren is the author of The Brain Injury Assessment Battery for Adults (biVABA) and is internationally recognized in her area of expertise of visual rehabilitation. Vision provides significance within the roles of daily living, to achieve optimal function and performance. The visual system detects and supplies information needed to adapt appropriately to social interactions, threatening situations, and motor actions in effort to conform to the environment. Individuals rely on sensory input that vision provides, to overcome complex challenges as well as to adapt to various dynamic changes every day. Intellectual, physical, and emotional perceptions of the world mold one’s acuity of life and the dimensions observed. With vision interrupted due to a brain injury or disease, various deficits will encompass hardships for the individual, disrupting the quality of life and decreasing overall occupational performance.

**How to Access/Order Assessment**

The biVABA test manual may be ordered on the visABILITIES website and includes all of the aspects to complete a comprehensive assessment of the client’s visual functioning (visABILITIES Rehab Services, Inc., 2014). This assessment may also be purchased by phone, by mail or fax with completed order form. The visABILITIES Rehab Services website provides additional products and resources for rehabilitation professionals to guide clinical practice and vision programs. Continuing education courses are available to develop expertise in visual impairment treatment.

**Cost of Acquiring Assessment**

The biVABA has a retail value of over $700.00, but is available by visABILITIES Rehab Services Inc. for $495.00 (visABILITIES Rehab Services, Inc., 2014). Products purchased will have a one year warranty and will be replaced due to manufacturer defects. This will contain all testing material needed to complete a comprehensive assessment of the client’s visual function. The biVABA also provides rationale for evaluation, allowing the therapist to explain the visual deficits to the client, family, physicians, insurance companies and other team members.

**Assessment Type**

**Standardized vs. Non-standardized**

The biVABA represents a standardized assessment measuring the interference of an individual’s occupational performance in relation to the visual perceptual deficits secondary to brain injury. Specific procedures are used to direct examiners to follow instructions based upon administration of each subtest. This assessment follows guidelines while utilizing explicit tools throughout each subtest proving the standardization is carried over throughout application.

Warren, Moore, and Vogtel (2008), state the biVABA serves as a cancellation test as well as “identifies the type of search strategy the client uses to locate targets and documents deviations associated with hemianopsia and neglect”. This analysis of search patterns “provides more useful information for intervention planning than tests that provide only time and errors (Warren, Moore, & Vogtel, 2008). In examining the changes post brain injury, the administrator can then utilize the data to “design specific interventions to reestablish a more effective search strategy in daily occupations” (Warren et al., 2008).

**Norm Referenced**

The biVABA does not address the assessment type, but using our clinical reasoning, we determined that a portion of the assessment is intended to be viewed as normative due to the data table found in Appendix G (Warren, 2006). As suggested in the manual, individuals are not compared to one another, but it is our understanding clients are compared to their own level of function and performance prior to brain injury. This factor leads us to believe it better represents a criterion referenced assessment, used to compare functional performance and screen for deficits. If visual deficits decrease performance in activities of daily living (ADL), clients will need further diagnosis and need for intervention.

**Purpose**

The biVABA is a clinical tool used by occupational therapists to screen for visual impairments following a brain injury. This provides relevant information addressing the client’s visual impairments and allows the therapist to plan interventions. Diagnostic assessments and procedures should not be replaced therefore ophthalmologists, optometrists, and neurologists should determine the diagnosis of visual impairment. The purpose of the biVABA is to improve the client’s occupational performance by developing interventions for the client while incorporating a vision and rehabilitation specialists. This utilizes an interdisciplinary team to facilitate communication and effort amongst specialists, to develop successful client-centered interventions (Warren, 2004).

**Intended Uses of Assessment**

    The biVABA is primarily used following a brain injury to understand visual function and visual perceptual impairments affecting performance. The results of the client’s test performance can enable intervention planning or determine if a referral is needed to an optometrist or ophthalmologist for further testing. Not only does the biVABA evaluate clients with brain injuries, but measures visual function secondary to macular degeneration, diabetic retinopathy, glaucoma, and other conditions.

**Development of Assessment**

**History**

Mary Warren is the author of the biVABA and is internationally recognized in her area of expertise of visual rehabilitation Mary Warren, an occupational therapist with extensive clinical experience, developed a screening tool to assess vision deficits after a brain injury and analyzes visual responses to one’s occupational performance. This biVABA was created in 1998 as a quick screening tool to acknowledge visual deficits upon brain injury. Diagnostic procedures are not eliminated or replaced and services should be requested through referrals if needed (Warren, 1998).

**Revisions**

The biVABA was published in 1998 by visABILITIES Rehab Services Inc. and revised four times beginning in 2001 through 2006 (Warren, 2006). These revisions were not addressed as to why they were necessary and the specific areas completed with revisions. It is possible that as technology expanded over the years to examine visual function after brain injury, the subtests needed to be modified to meet the advancements of technology, in order to continue utilization of the biVABA.

**Alternative Forms**

Alternative forms of this assessment are not available; however, additional products designed by Mary Warren are provided online for purchase. These include pre-reading & writing exercises to improve scanning performance in clients with macular scotomas, a comprehensive guide with suggestions to starting a low vision rehabilitation program, as well as a compiled package of questions and answers for teachers of vision impaired children. These resources contain helpful material to understand visual deficits.

**Characteristics/Traits**

**Uniqueness**

The biVABA shows unique characteristics for practitioners providing several resources to enhance the meaning and delivery of this assessment. Definitions and explanations are included throughout each subtest in the manual, justifying the testing approach through the analysis of neuroanatomy feedback. This allows test administrators to understand why each subtest is performed, while providing clients or client family members with relevant information in relation to the client’s condition. Intervention suggestions are also indicated to assist practitioners in guided treatment. Examples are shown with figures and text, explaining the advantages and disadvantages upon intervention for the subtests administered. Appendix C provides resources that contribute to the biVABA assessment including techniques on ocular training, adaptive equipment, as well as additional visual skill exercises (Warren, 2006).

**Items of Interest**

The biVABA overlaps with visual specialists in the ophthalmology and optometry departments. Clients are often referred for further evaluation after the biVABA has been administered. Appendix D provides test administrators a sample letter and form for consulting with ophthalmologists and optometrists to properly refer clients for a visual impairment consultation. This will ensure all noted essentials of the client are documented and will save practitioners time. An additional form is provided for the visual specialist in relation to the referral. This form provides an outline for vision specialists to document the needed information for the test administrator including the visual acuity, visual field, ocular motility, and any other pertinent ocular diagnoses found.

**Population/Clients**

This test was designed for adults with at least a 5th grade level of education and primarily utilized for ages 14 years and older. Modifications may be made to assess performance in children as young as 8 years of age; however, it is not recommended.

**Intended Population**

The intended population the biVABA should be completed with includes anyone who has experienced a brain injury. This consists of individuals diagnosed with a cardiovascular accident (CVA), traumatic brain injury (TBI), brain tumor, anoxia, degenerative neurological diseases including Alzheimer’s, encephalopathy, and multiple sclerosis.

**Alternative Populations**

Alternative clients include individuals with trauma to the eye, age related eye disease such as macular degeneration or glaucoma, or a disease that affects the ocular system such as diabetes or hypertension.

**User Qualifications**

The biVABA does not have any specific training in order to complete the screening with a client. This tool was designed by an occupational therapist for occupational therapists to use as a quick screening tool and intervention planning for patients with potential visual deficits post brain injury (Pendleton & Schultz-Krohn, 2013, p.600). Clinical observation prior to administration of the assessments is recommended using the provided form, and would be difficult and inaccurate if performed by an individual lacking clinical observation training. Therefore, an occupational therapist or knowledgeable occupational therapy assistant could successfully administer the assessment to a client. The licensed occupational therapist would be responsible for interpreting the data, as in any standardized assessment.

**Familiarity with Population, Context or Setting**

Familiarity with the population of brain injured clients will allow the administrator a better understanding of when it is necessary to administer such a screening tool. The results of the subtests are meant to serve as guidelines for intervention planning; however, previous experience in presenting interventions to a brain injured client will only make this process easier and more helpful.

**Specific Qualifications to Administer**

The manual suggests that the administrator be familiar with various visual deficits that can occur post brain injury. Having a better understanding of the signs of abnormal vision will support the need to utilize this tool.

**Clinical Utility and Practical Considerations**

**Availability of Test and Ease of Use**

The biVABA assessment is available for purchase on the publisher’s visABILITIES website. Unlike many other standardized assessments, the biVABA does not state a level of qualification in order to purchase and the website has no credential checking system, limiting the management of who is capable of possessing and administering the battery of assessments.

**Administration Time**

A designated testing time is not provided in any of the assessment resources. It is identified that the various assessments of the battery can be delivered over a series of treatment sessions (Warren, 2006). We believe this option is provided to employ flexibility to the administrator due to time constraints and the client’s level of ability. It can be assumed that a client with a more severe brain injury will take longer to complete the entire battery of assessments than a client with a mild brain injury, or a diagnosis not including any brain trauma.

**Learning the Test**

The assessment kit includes a written manual as well as a CD ROM with downloadable testing instructions. The CD ROM proves to be a valuable resource as it contains video demonstrations of each assessment. Following the administrator guidelines, are instructions to be read to the client with diagrams showing expected setup for administration. It is recommended that the administrator read through the manual several times before the first administration in order to improve their familiarity with the protocol.

**Format**

Many of the client responses are observable by the administrator using a nominal level of measurement. Documentation of specific eye and pupil responses are to be made on the given response forms. Considerations must be given for older clients and those who have suffered brain trauma in terms of time to respond and legibility of responses. Delayed responses are not always indicative of inability to complete the task correctly.

**Administration and Test Procedures**

The appropriate procedures for testing are clearly listed at the start of each assessment subtest in the manual. The manual provides adequate instructions for the administrator to follow for each section of the assessment. The five assessments of the battery should be completed in the specified order as found in Section 4 of the testing manual. The idea of visual hierarchy is promoted with visual acuity establishment before the interpretation of contrast sensitivity, followed by visual field, oculomotor function, and visual attention respectively (Warren, 2006). Any client modifications due to non-compliance, appropriate verbal cues, procedures, and accommodations are to be found in each individual subtest section of the manual. The manual is rather comprehensive and specific to conditions in order to maintain test reliability and validity.

**Response Format**

Each subtest has a response form provided in the assessment kit to document client performance. Some tests require a simple check in the appropriate box, while others have diagrams to be marked and each section has a box for any additional comments to be written down by the administrator. Some of the tests require the client to copy or write the appropriate responses either on the provided form or an additional source not supplied in the test kit.

**Scoring**

Documenting the client response to each subtest provides the necessary data for scoring. Only one subtest, visual search, provides a table for analysis of normative data. The remaining subtests score based on response type rather than a point system. A few of the responses can be translated into percentages based on the total ability or fraction completed for the given test.

**Interpretation**

Section 5 of the testing manual provides detailed interpretation standards for each subtest (Warren, 2006). It is up to the administrator to determine if client responses are worthy of further referral for visual impairment diagnosis. Secondary to referral, the administrator must observe each subtest response to identify areas of decreased performance and functionality due to potential visual impairment. These observations can help the administrator create appropriate interventions for the client on an immediate basis pending further diagnosis.

**Setting**

The most appropriate settings for use of the biVABA would be in a hospital acute care setting or inpatient rehabilitation center depending on the initial referral post brain injury. The testing manual suggests it be given as soon as the client is referred for treatment to reduce the time between referral, diagnosis, and modification to increase function (Warren, 2006).

**Tools and materials**

Each assessment kit supplies various tools for the client and administrator. Test charts, scoring templates, assessment and subtest forms that are necessary to complete the screening tool are included in the carrying case. The provided CD ROM has the same forms, free of cost, in a PDF downloadable form in case any additional forms are needed. Miscellaneous tools such as a penlight, stickers, and target examples are provided as well. As listed in Appendix H, there is a list of items not provided that are essential to the assessment and will need to be purchased prior to testing (Warren, 2006). Many of the items not provided are low cost and easy to access, such as the felt tip pens; while others, such as the book stand easel, are more costly and are less transportable.

**Documentation on the Assessment**

Within the observation documentation forms provided for the subtests, there areas for documenting client performance. This information can be used by a therapist in a written referral to an optometrist or ophthalmologist. “Appendix D provides an example of a cover letter and form jointly developed by an occupational therapist and a neuro-ophthalmologist to use when seeking an ophthalmology or optometry consultation” (Warren, 2006). After the therapy session has concluded, the therapist may document the interpretation results in the assessment portion of the SOAP note or daily note, per facility standards. The biVABA screening tool will not provide comprehensive qualitative data for the administering therapist; however, observational data and intervention plans and goals can be deciphered.

**Description of Technical Manual**

The biVABA assessment kit provides both a written manual and a CD ROM version for the administrator. This provides an advantage for the administrator in choosing which format they prefer to reference. The CD ROM also includes copies of the necessary forms and video examples of test administration. The language of the manual is easy to read and provides layman’s instructions for the client to better understand testing procedures. The comprehensive nature of the manual is advantageous for someone who has little to no background knowledge in visual function and brain injury; however, the information given is intimidating in length and requires a sufficient amount of time to read through.

**Review of Literature**

Radomski, Davidson, Voydetich, and Erickson (2009) looked at the need for specific evidence-based practices in rehabilitation for service members who have sustained a mild TBI (mTBI). Areas of concern for occupational therapy practice in the mTBI population are defined as client education, cognition, vision, resumption of roles and emotional well-being (Radomski, Davidson, Voydetich, & Erickson, 2009). The goal was to create a guideline of recommended therapy practices and to increase the use of evidence-informed therapy practices, readying “occupational therapists to contribute to, if not lead, rehabilitation and reintegration efforts that address the physical, emotional, social and spiritual well-being of service members and their families” (Radomski et al., 2009). Due to the varying degrees of severity and differences in symptoms post mTBI, there is potential that visual deficits will go unnoticed in initial evaluations. If occupational therapists are familiar and comfortable performing vision screens, such as the biVABA, these deficits can be detected and referred out to vision specialists. The results of a screening tool can equip the therapist with remedial and compensatory intervention approaches to address the deficits and can be overseen by the vision specialist. Having evidence-based practices, including standardized assessments during occupational evaluations and interventions, can expand the expertise of occupational therapists and help serve a growing population of soldiers and veterans who have sustained an mTBI (Radomski et al., 2009).

Another article that justifies the use of the biVABA as an effective screening tool evaluated it in conjunction with other standardized assessments to measure fitness to return to driving prior to an on-road driving assessment in patients post stroke (Stapleton & Connelly, 2010). Driving is considered a valued instrumental activity of daily living (IADL) by many adults worldwide and the ability to regain independence in driving post stroke can be influenced through occupational therapy rehabilitation. Thirteen clinically practicing therapists, including the two authors, collaborated to define evaluation areas in determining fitness to return to driving and also which assessments would be best to utilize. They agreed upon testing vision, cognitive, perceptual, and executive functioning in the patients and that a formal assessment of vision should be completed by a qualified practitioner such as an optometrist or ophthalmologist (Stapleton & Connelly, 2010). Five of the participants recommended using the biVABA as a vision screening tool and gave it relatively high individual ranking scores. The data collected in this study is helpful in determining the most appropriate tools to use in patient screening and recommendations for further assessment. There is promotion for future research in the end result effectiveness in programs such as on-road driving assessments with stroke patients.

Lastly, in 2008, Warren et al. conducted a study utilizing healthy adults to test typical performance on several subtests included in the biVABA. The visual search strategies used during the cancellation tests were studied with a convenience sample of men and women covering each decade between 20 and 90 years of age. For practitioners utilizing the biVABA as a screening tool, it is proposed they will identify deficits in visual function; however, it had not before been analyzed in healthy adults to determine functional differences in performance factors. Seven subtests were performed and it was found that most healthy adults complete the visual scanning process in a structured, linear pattern (Warren et al., 2008). Patterns were changed if the participant found it to be advantageous in completion of the subtest, but overall there were no statistically significant differences between age or gender other than the older participants (over 60 years) needed more time to complete the tests (Warren et al., 2008). Though this was a small sample size study, the knowledge of typical performance on the cancellation subtests is critical in creating scoring guidelines for the screening tool. This helps create a more accurate portrayal of strengths and limitations in the brain injured client undergoing the screening and increases reliability of data interpretation.

**Psychometric Properties**

**Reliability, Validity, Sensitivity and Specificity**

Little data or information is available concerning the reliability and validity of the biVABA. Stapleton and Connelly (2010), address the biVABA as a recommended standardized assessment by therapists with high rankings by those individuals. It would seem evident that individual reports support the assessment in greater detail than any published journals to be found. Documentation shows poor reliability and eliminates rationale of statistics due to methods of modification. Validity was also not mentioned in the test manual concluding that strength of this assessment is decreased. Normative data was only provided for the visual search subtests and not discussed with further subtests. The sample size of the data included 25 males and females ages 16-83 years old. We believe this sample size was relatively small and additional subtests should be included with data to support this assessment tool. The utilized population representing the data shows no correlation of visual diagnosis or how the participants were selected.

**Student Critique**

**Strengths**

The biVABA demonstrates several strengths throughout utilization. The test manual provides adequate elements of how to administer and understand each subtest. Information of the neuroanatomical origins provides feedback for the test administer as to why each test is being directed. This may ease explanations to the client and family due to the extensive information provided to help better understand visual impairments. Occupational therapists will be granted opportunities to better understand what the client is experiencing based on this information. The biVABA is stored in an organized portable container that can be mobile in practice and easily stored. Several additional tools are found within the appendixes that are useful for practitioners when administering this test. Referral notes for physicians and intervention plans for therapy support occupational therapists to not feel overwhelmed by the components of this test.

**Limitations**

The biVABA shows limited sources to determine the type of assessment and the explanation of validity and reliability. One data table was found utilizing normative information to assist our explanation with the type of assessment that the biVABA represents.  Without the statistics proving reliability and validity for each subtest, administrators may show difficulty when justifying this test to clients and third-party payers. Another limitation we found to be evident in today’s society is the advancement in technology and knowledge. We agreed that this test may not need to be considered throughout practice because of the insight gained when gathering an occupational profile. Physicians may also acknowledge the visual deficits in TBI patients and inquire furthering evaluation by a visual specialist before an occupational therapist is involved with treatment.

Additionally, the testing environment may be limited due to the specification guidelines presented in the manual. The proper amount of lighting, direction of lighting, appropriate space and decreased distractibility must be followed to administer each subtest. This could be problematic in various settings as many rooms come equipped with one degree of lighting that is usually fluorescent lighting in the ceiling. Providing adequate space for the tests requiring distance between the client and the materials will prove to be difficult is certain settings as well as finding a room that is limited in ambient sounds and visual distractions. There is concern that the assessments would be given in an unqualified space, despite the specifications, due to necessity.

**Recommendations**

The extensive information that is included in the biVABA could be separated into another manual. This would condense and organize the material in a user-friendly way. The manual provides an exceptional amount of information, but would save administrators time if key references, interventions, and test directions for administration were divided into three separate manuals. An additional recommendation is to provide a short-form for practitioners to increase testing utility. Time constraints may force test administrators to skip steps or eliminate the biVABA from assessment options.

**Summary**

Overall, the biVABA proves to be a comprehensive tool in the use of visual function screening and intervention planning. Though the research is sparse, there are several potential avenues of utilization in the realm of occupational therapy. Given further research into the reliability and validity of the assessment as well as a few organizational changes within the manual, the biVABA has potential to remain a chosen tool for therapists as they strive to lead the world of rehabilitation with client-centered and evidence-based practices.

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