ABF Behavioral Health

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ABF Behavioral Health Client Evaluation Report

Date: November 2, 2020

Client Information:

Name: Patient
Gender: Male
Handedness: Right
Date of Birth: 04/13/2001
Age: 19Y
Medications:

Reason(s) for Study: Evaluation for mild traumatic brain injury, pediatric seizures (exacerbated by stress), and symptoms associated with PTSD, anxiety, depression, and attention.

Client History:

The Patient is a right-handed 19-year-old male, who speaks only American English. The Patient's father works in real estate. His mother is a homemaker. At the time of his epilepsy diagnosis in 2012, the Patient was living in a very high stress household until November of 2019. His mother has been diagnosed with borderline personality disorder, and her relationship with the Patient was deemed detrimental to his self-concept. The Patient currently resides with his father in Puerto Rico, and is moving to Tampa, where he desires to attend Hillsborough Community College sometime in the next 6 to 9 months.

The Patient's father resides in Puerto Rico during the week, but travels to Tampa each weekend Friday through Sunday. The Patient has friends in the area who can provide some amount of social support. His mother lives in Pennsylvania, and they have little to no ongoing interaction. The Patient is very excited about this course of action for his future and is hoping that this will help him lead a happy fulfilling life as an adult. The Patient attended the initial interview with the Patient's father and Dr. Lambos.

The Patient's father reports the Patient experienced a full gestation, but labor and delivery was complicated by a drop in fetal blood pressure due to umbilical cord issues. He was born via emergency cesarean section. The father reports the Patient was initially blue in color at birth, but after a brief stay in the neonatal intensive care unit (NICU), his vitals stabilized and returned to normal. He reached all developmental milestones, including language and motor milestones, within an expected time frame. The Patient and his father report a

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history of epilepsy, first diagnosed in 2012, when he was 12-years old. It was determined he suffered from absence seizures. The Patient was treated by a neurologist who put him on Keppra and Depakote to control the seizures.

The Patient started seeing a counselor to deal with stress and depression in 2012 after the diagnosis of epilepsy. Academics had been declining since the 5th grade, and he was notedly becoming more introverted and suffering from adjustment issues. In November of 2019, The Patient ran away to live with his Uncle and Aunt in Puerto Rico and stopped taking all medications. He has not experienced a seizure in the last three to four years. The Patient assumed living with his aunt and uncle was going well, but he was informed via a text message while traveling with his father in February of 2020 that his aunt had packed his belongings and he would not be welcomed back. The Patient states that this sequence of events was very traumatic, and he took it very hard; he moved in with his father but was psychologically troubled; it took months for the Patient to recover from that situation.

The Patient's counselor, the same one who has been treating him since 2012 said the Patient shows the signs of PTSD, Anxiety, ADD and Depression. This is typical of a son raised by a borderline mother. The seizures now appear to be "contact" seizures from the stress. The Patient currently cannot focus and read or study, is lethargic, and lacks any sort of ambition and planning ability for his future. The Patient is a very bright young man as tested recently for admission to Tasis Academy in Dorado, Puerto Rico. He and his father want to determine the source of his functional difficulties. They feel his problems may reflect a neurological issue. The Patient reports he suffered an undiagnosed seizure at 3 months of age that lasted literally 24 hours and was in this high stress environment where he was not allowed to grow by his mother's controlling and non-validating personality.

Before resuming medication, father and son want to have his brain re-tested (previous numerous EEGs show abnormal activity) and consider alternatives to medications such as neurofeedback.

The Patient's medical history is also significant for a concussion sustained approximately four-years ago (March 2016). Per self-report, the Patient collided with another student in the hallway at school. Per medical records, he did not lose consciousness. The Patient reported that he had many residual symptoms following his concussion including light sensitivity, headaches, and slowed processing. At that time, the Patient began to see a doctor at the Children's Hospital of Philadelphia Care Network to treat his concussion. According to medical records provided by his parents, the Patient was initially evaluated by on 3/7/2016 and diagnosed with Post-Concussion Syndrome. The Patient reports no infectious diseases of the brain, nor any fever over 105 degrees. The Patient reports no major surgery and therefore no sequelae and no issues following

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general anesthesia. He reports no exposure to environmental toxins such as insecticides or mold. The Patient reports no dietary restrictions, but he has a history of being a "poor healthy eater" where it has been difficult to get him to make healthy food choices. He reports his sleep habits are typical, having no difficulty falling and/or staying asleep. The Patient reports no use of cannabinoids, alcohol, or nicotine. He reports no abuse of prescription medications.

The Patient reports that he was considered a good student in elementary and middle school but needs to return to school to finish his GED. He wants to attend Hillsborough Community College. According to the neuropsychological assessment given in 2017, while the Patient excelled overall throughout elementary school, as the demands increased in middle school, the Patient began to struggle more academically. The Patient struggled in math for the last three years of high school despite maintaining honors status. According to the Patient and his parents, most recently (in 2017) he had been having trouble in Mandarin, math, and science. His parents became particularly concerned about the Patient's academic performance following his concussion in March of 2016. While The Patient's parents initially described worsening in academic performance following his concussion, his report cards from sixth through eighth grade indicate emerging academic difficulty prior to the concussion.

Regarding social/emotional history, the Patient's parents became concerned about his behavior and emotional functioning following his diagnosis of epilepsy in 2012. At that time the Patient became more withdrawn and less interested in socializing with his peers. Currently, the Patient's parents noted his flat affect and stated that he seems somewhat "shut down emotionally." The father noted concern about some anxiety, and particularly some social anxiety beginning in 2012. This never improved and became his current state of functioning. Beyond the aforementioned seizures and head injury, the only other major medical issues are mononucleosis this year, however there is much psychological trauma due to events related to housing.

The Patient presents at ABF Behavioral Health today for an evaluation of for seizures exacerbated by stress, and symptoms associated with PTSD, anxiety, depression, and attention. His goals of therapy include acquiring an assessment of functioning, identifying the impact of developmental history including seizures, head injury, and motivational/executive functioning, and developing autonomy. His medical and developmental record was reviewed and is reiterated here in summary format as is deemed relevant.

Record Review

The Patient had an extensive neuropsychological evaluation dated 4/3/2017

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and 4/05/2017. The evaluation found the Patient presented with a medical history significant for a diagnosis of epilepsy (2012) and a concussion (March 2016), as well as a possible hypoxic event during birth. Cognitive testing highlighted overall Average intellectual functioning, with a particular strength in the area of verbal reasoning. The following were diagnosed for the Patient at that time: The Patient's history does not support a diagnosis of Attention Deficit Hyperactivity Disorder, his pattern of performance on testing, coupled with findings from rating scales and the clinical interview, are indicative of a diagnosis of Mild Neurocognitive Disorder due to Multiple Etiologies (Traumatic Brain Injury and Epilepsy) (G31.84).

With regards to social and emotional functioning, the Patient presents as an adolescent who has recently been struggling with symptoms of depression and anxiety. While The Patient's current severity of symptoms did not reach the level to warrant a diagnosis of Major Depressive Disorder, the Patient is nevertheless experiencing distress. His presentation is best captured by a diagnosis of Adjustment Disorder with mixed anxiety and depressed mood (F43.23), to highlight the development of emotional and/or behavioral symptoms in response to a specific stressor or stressors, which typically cause impairment across important areas of functioning. It is of note that symptoms of anxiety and depression can further deplete attentional resources, affect learning and memory, and exacerbate academic difficulties. These difficulties were seen in the context of a bright young man who is intellectually and academically capable. Nevertheless, his diagnoses of Mild Neurocognitive Disorder and Adjustment Disorder are contributing to considerable difficulties in his ability to work consistently to his potential and in the social realm. Given The Patient's vulnerability to experience depressive and anxious symptoms under times of heightened stress, the need for continued psychological intervention and monitoring of his emotional well-being is indicated. He will also benefit from accommodations and support in school to allow him to demonstrate his capabilities. The following was specifically recommended for the Patient: individual psychotherapy (including relaxation techniques targeted to treat anxiety, as well as psychoeducation), family therapy, psychiatrist referral for medication and medication management, academic accommodations, and support (i.e., preferential seating, specialized notetaker/audio recordings of lectures with a "smartpen", tests taken in a separate room, reconsideration of his current course load), and exploration of provided resources.

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Assessments Administered

Neurodiagnostic Interview by Dr. Lambos with the Patient's father and the Patient
Record Review
Beck Anxiety Inventory (BAI)
Beck Depression Inventory-II (BDI-II)
Comprehensive Executive Function Inventory (CEFI)-Adult (CEFI-Adult)
Gilliam's Asperger's Disorder Scale (GADS)
Personality Assessment Inventory (PAI)
SPECTRA Indices of Psychopathology
Trauma Symptom Inventory-2 (TSI-2)
CNS Vital Signs (CNS-VS)
Conners Continuous Performance Test-III (CPT-3)
Conners Auditory Test of Attention (CATA)
Wisconsin Card Sorting Test (WCST)
Raven's Progressive Matrices-Standard (RPM-S)
Quantitative EEG Study (QEEG)

Assessment Performance

The Patient presented appropriately dressed for his age, in casual attire, on both appointment days. During day one of the assessment, the Patient presented friendly and cooperative throughout the testing process. He appeared appropriately motivated. The Patient behaved appropriately for circumstances. He developed an easy rapport with the therapist, he spoke casually about presenting issues and filled in some of the blanks from his history with ease and comfort. The Patient remained very talkative throughout both days of testing. Regarding clinical observations, high beta waves were identified in the left temporal (T3) region throughout the eyes-closed (EC) and eyes-opened (EO) recordings. also, his EC recording test-retest for the Laplacian montage had to be hand artifacted. The Patient completed the qEEG, CNS-VS, CEFI, and TSI-2 on the first day of assessment. During the second day of assessment, the Patient appeared to be motivated and was friendly, calm, and cooperative throughout testing procedures. He behaved appropriate for the circumstances. He finished all tests in a timely manner (BAI, BDI-II, SPECTRA, GADS, PAI, CPT-3, CATA, WCST, and RPM-S).

Summary of Assessment Results

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1. *Beck Anxiety Inventory (BAI):* The BAI is designed to assess panic symptomatology by discriminating anxiety from depression in individuals.

   See Figures 1a-1b. The Patient's responses to the BAI score 6 out of a possible 63 points, which is indicative of an individual who is experiencing a minimal (non-clinical) level of anxiety. The Patient responded mildly to items on the questionnaire involving being unable to relax, feeling nervous, and experiencing indigestion or discomfort in the abdomen. He responded severely to feeling hot.

   Overall, his BAI profile is consistent with a minimal, non-clinical level of anxiety.

2. *Beck Depression Inventory-II (BDI-II):* The BDI-II is one of the most widely used instruments for measuring the severity of depression. The BDI-II is designed for individuals aged 13 and over and is composed of items relating to depression symptoms such as hopelessness and irritability, cognitions such as guilt or feelings of being punished, as well as physical symptoms such as fatigue, weight loss, and lack of interest in sex.

   See Figures 2a-2b. The Patient's responses to the BDI-II score 7 out of a possible 63 points, which is indicative of an individual who is experiencing a minimal, non-clinical level of depression. The Patient responds mildly to not enjoying things as much as he used to, being more critical of himself, being less interested in people or things than before, finding it difficult to make decisions, sleeping somewhat less than usual, having less of an appetite, and not being able to concentrate as well as he used to. He responded minimally to not feeling sad, not being discouraged about his future, not feeling guilty, not feeling as if he is being punished, feeling about the same as ever about himself, not having any thoughts of killing himself, not crying any more than he used to, being no more wound up or restless than usual, not feeling worthless, having as much energy as ever, being no more irritable than usual, not being more tired than usual, and not noticing any changes in his interest in sex.

   Overall, the Patient's responses to the BDI-II are consistent with a minimal, non-clinical level of depression that does not appear to impact daily functioning.

3. The Comprehensive Executive Function Inventory Adult (CEFI Adult™): A Self-Report Form is used to quantify an individual's level of executive function. In combination with other information, results from the CEFI Adult help calibrate an individual's level of executive function in the following areas: Attention, Emotion Regulation, Flexibility, Inhibitory Control, Initiation, Organization, Planning, Self-Monitoring, and Working Memory.

   See Figures 3a-3d. The Patient and the Patient's father completed the CEFI-Adult regarding the Patient. The Patient's scores on the CEFI show

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he scores himself in the low average range for attention, organization, and working memory, below average range for initiation, which is considered an executive functioning weakness, and average for all other domains. The Patient's father scored the Patient similarly with low average scores for attention and average scores for inhibitory control and either below or well below average and executive functioning weaknesses for the following domains: initiation, organization, planning, self-monitoring, and working memory. He also scored the Patient high average for emotional regulation, which is considered and executive functioning strength. He scored the Patient low average for flexibility.

Overall, this is consistent with the Patient feeling he struggles with initiation and possibly some attention issues while the father feels the Patient struggles with many areas of executive functioning including initiation, organization, planning, self-monitoring, and working memory.

4. *Gilliam's Asperger's Disorder Scales (GADS):* Based on the most current and relevant definitions and diagnostic criteria of Asperger's Disorder, the GADS is useful for contributing valuable information toward the identification of children who have this disorder. The GADS provide documentation about the essential behavior characteristics of Asperger's Disorder necessary for diagnosis. It can be used in the assessment process, documenting behavioral progress, and targeting goals for IEPs.

   See Figure 4a-4b. The Patient and his father completed the GADS regarding the Patient. Scores on the GADS are *consistent with a high/probable probability for the disorder formerly known as Asperger's Disorder, now referred to as high functioning Autism Spectrum Disorder (ASD)*.

   The Patient evinces many behaviors and has notable difficulties with social interactions. His thought patterns are only somewhat coherent, and there is evidence of at least social detachment, resentment, and some thought disorder. Whether or not the Patient is considered to meet the criteria for ASD, he certainly suffers from a host of pragmatic deficits, not only in language but in mannerisms and interpersonal skills.

5. *Personality Assessment Inventory (PAI):* The PAI is a general questionnaire-based assessment that is intended to identify personality variables of interest and to screen for evidence of psychopathology.

   See Figures 5a-5b. The clinical profile for the Patient indicates that he did not attend appropriately to item content and did not respond in a consistent fashion to similar items, with the number of uncompleted items within acceptable limits. Certain indicators fall outside of the normal range, suggesting that the Patient may not have answered in a completely forthright manner, therefore the nature of his responses might

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lead the evaluator to form a somewhat inaccurate impression of him, based upon the style of responding described.

With respect to positive impression management, the Patient's pattern of responses suggests that he tends to portray himself as being exceptionally free of common shortcomings to which most individuals will admit. As a result, he will be quite reluctant to admit to minor faults, perhaps not even willing to admit these faults to himself. He may be blindly uncritical of his own behavior and insensitive to negative consequences associated with his behavior, tending to minimize the negative impact that his behavior has on others and on himself. Given the high level of defensiveness, the clinical scale profile potentially reflects considerable distortion and minimization of difficulties in several areas, and the professional should review the test results with this in mind. Regardless of the cause, *THE TEST RESULTS ARE UNLIKELY TO BE A VALID REFLECTION OF THE PATIENT'S EXPERIENCE—THE FOLLOWING INTERPRETATION IS PROVIDED ONLY AS AN INDICATION OF THE PATIENT'S SELF-DESCRIPTION.*

Despite the level of defensiveness noted above, there are some areas where the Patient described problems of greater intensity than is typical of defensive respondents. These areas could indicate problems that merit further inquiry. These areas include: disruptions in thought process; alcohol abuse or dependence; preoccupation with physical functioning; unsupportive family or friends; feelings of helplessness; distrust; hostility and bitterness; poor interpersonal rapport; thoughts of death or suicide; physical signs of depression; unhappiness; frequent routine physical complaints; poor sense of identity; failures in close relationships; irrational fears; suspiciousness; and moodiness.

With respect to negative impression management, there are subtle suggestions that the Patient may see himself in a negative or pathological manner in particular areas. Some concern about distortion of the clinical picture must be raised as a result. Although this pattern does not necessarily indicate a level of impression management that would render the test results uninterpretable, the clinical hypotheses presented in this report should be reviewed with these considerations in mind.

The PAI clinical profile reveals no marked elevations that should be considered to indicate the presence of clinical psychopathology. Scores on one or more scales do, however, show moderate elevations that may reflect sources of difficulty for the Patient. These potential problem areas are described below. The Patient reports that alcohol use has caused occasional problems in his life. These problems may involve difficulties in interpersonal relationships, problems on the job, and/or the use of alcohol

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to reduce stress. It should be noted that The Patient denies any current use of substances, including alcohol.

Certain elements of the Patient's self-description suggest that others are likely to see him as being withdrawn, aloof, and somewhat unconventional. He describes himself as being more wary and sensitive in interpersonal relationships than the average adult. Others are likely to see him as tough-minded, skeptical, and somewhat hostile. According to the Patient's self-report, he describes NO significant problems in the following areas: antisocial behavior; problems with empathy; extreme moodiness and impulsivity; unhappiness and depression; unusually elevated mood or heightened activity; marked anxiety; problematic behaviors used to manage anxiety; difficulties with health or physical functioning.

The Patient's self-concept appears to involve a fixed, rather negative self-evaluation. He is likely to be self-critical and to focus upon past failures and lost opportunities. He may be more troubled inwardly by self-doubt and misgivings about his adequacy than is apparent to others. He may tend to play down his successes as a result, dismissing such accomplishments as either good fortune or the result of the efforts of others.

The Patient's interpersonal style seems best characterized as withdrawn and introverted. He likely appears to others as if he has little interest in socializing. In fact, he probably does not invite social interaction with others and likely makes no special effort to appear friendly.
He may derive little enjoyment from such interactions and as such it would not be expected that he would have an extensive social network. He is likely to be rather passive and distant in those relationships that are maintained. In considering the Patient's social environment with respect to perceived stressors and the availability of social supports with which to deal with these stressors, his responses indicate that he experiences his level of social support as being somewhat lower than that of the average adult. He may have relatively few close relationships or be dissatisfied with the quality of these relationships. However, he reports relatively little stress arising from this or other major life areas.

The clinical profile for the Patient is consistent with multiple diagnoses. The PAI instrument itself suggests the following:

Rule in:
V62.81 Relational Problem NOS (Family or Marital Problem)
Rule Out:
305.00 Alcohol Abuse

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301.9 Personality Disorder NOS (Mixed Personality Disorder with Paranoid, and Schizoid Features)

We have not yet examined sufficient data for this Patient to endorse any of these diagnoses, nor to concur with the offered diagnostic rule-outs. Our final diagnoses will depend on a full examination of the Patient's assessment data will be presented in a separate section below.

Overall, the Patient's responses indicate a very quiet and socially secluded individual. His self-description suggests that others are likely to see him as being withdrawn, aloof, and somewhat unconventional. He is wary regarding interpersonal relationships and has a rather negative self-evaluation. Being very critical and focusing on past failures. He is withdrawn, introverted, and has very little interest in socializing. Deriving little enjoyment from such interactions. The Patient's score on the PAI show moderate elevations on the paranoid, schizophrenia (thought disorder), depression and somatic domains. Specifically, resentment (PAR-R), social detachment (SCZ-S), health concerns (SOM-H), cognitive depression (DEP-C), hypervigilance (PAR-H), thought disorder (SCZ-T), somatization (SOM0S), affective and physiological depression (DEP-A & DEP-P), negative relationships (BOR-N), and egocentricity (ANT-E). The Patient also reports that alcohol use has caused occasional problems in his life. These problems may involve difficulties in interpersonal relationships, problems on the job, and/or the use of alcohol to reduce stress.

6. *SPECTRA™ Indices of Psychopathology:* Was developed using a rational-empirical method based on the three-factor quantitative model and can be used to evaluate individuals in a variety of clinical settings. It is composed of 12 clinical scales: Depression (DEP), Anxiety (ANX), Social Anxiety (SOC), Post-Traumatic Stress (PTS), Alcohol Problems (ALC), Severe Aggression (AGG), Antisocial (ANTI), Drug Problems (DRG), Psychosis (PSY), Paranoid Ideation (PAR), Manic Activation (MAN), and Grandiose Ideation (GRA). The SPECTRA also include three supplemental scales: Cognitive Concerns (COG), Psychosocial Functioning (PF), and Suicidal Ideations (SUI). The 12 clinical scales align with common DSM-5™ diagnoses and the clinical scales are organized into three higher-order spectra: o Internalizing: DEP, ANX, SOC, PTS. o Externalizing: ALC, AGG, ANTI, DRG. o Reality-Impairing: PSY, PAR, MAN, GRA. The SPECTRA scores combine to provide a General Psychopathology Index (GPI), which measures the total burden of psychopathology.

   See Figures 6a-6b. Generally, any scores below 60T are considered normative. The Patient's responses to the SPECTRA indicate no clinical elevations in any psychopathology domains. There are subclinical

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elevations in the following domain: cognitive concerns (COG) (58T), suggesting some difficulties in terms of thinking (e.g., losing/ forgetting things, organizational problems), post-traumatic stress (PTS) (57T), suggesting intrusive thoughts about a past, traumatic event, depression (DEP) (55T), suggesting some evidence of underlying sadness, hopelessness, and loss of pleasure that may impact functioning. The SPECTRA Profile Classification Index falls into the acceptable range. The SPECTRA Infrequency scale falls into the acceptable range.

The scales indicate the Patient is largely free from indications of psychiatric pathology. There are mild elevations, however, that match those seen in the PAI. Among the areas we see as consistent across measures are concerns with cognitive functioning and physical health, minimal to mild depression and anxiety, and mildly disordered theory of mind.

7. *Trauma Symptom Inventory-2 (TSI-2):* The TSI-2 is relatively unique in comparison to other measures of posttraumatic symptomatology, in that it is a multi-scale instrument, including 10 scales of various forms of clinical psychopathology related to psychological trauma.

   See Figures 7a-7c. The Patient's results on the TSI-2 show no elevated scores in any domains. He shows moderate clinical elevations in the dysfunctional sexual behavior (SXD-DSB), sexual disturbance (SXD), sexual concerns (SXD-SC), and depression (D) domains suggesting poor sexual boundaries, reduced sexual impulse control, sexual conflicts and dysfunction, and/ or a general negative reaction to sexual situations, and a pattern of impulsive or compulsive sexual behavior that may be maladaptive in some way, as well as symptoms associated with depression. He endorses one critical item, "Having sec with someone you hardly knew", and all factors are within normal limits (WNL) except self-disturbance (SELF), which is slightly elevated in the 60% range. The lack of a stable, on-going model of self or identity, in combination with disturbed relationships with others, often leads to depressive, or at least dysthymic emotional states.

   These scores are thus consistent with the Patient having experienced and been impacted by instances of traumatic exposure; however, he does not meet the criteria for Posttraumatic stress disorder. Nonetheless, elevated somatic concerns and symptoms associated with depression and anxiety are consistent with other results, and likely to interfere with physiological functioning. These results are also seen in results from the PAI.

8. *CNS-Vital Signs (CNS-VS):* CNS-VS is a multimodal clinical assessment that includes both appropriate neurocognitive tests and evidence-based

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symptom, behavioral and functional rating scales. The battery employs standardized measures to evaluate psychological and neuropsychological performance and functioning relative to normative data. CNS-VS yields consistent and accurate measurement of minute cognitive changes, such as those associated with drug effects and cognitive impairments.

See Figure 8. The Patient's results on the CNS-VS show most scores in the average range. He scored low average on executive function and above average on reaction time. All scores were deemed valid.

Overall, these results indicate an average neurocognitive index with no diagnosable deficits in neurocognitive functioning.

9. *Conners Continuous Performance Test-III (CPT-3) and Conners Continuous Auditory Test of Attention (Conners CATA™):* The CPT-3 assesses attention-related problems in individuals aged eight years and older. By indexing the respondent's performance in areas of inattentiveness, impulsivity, sustained attention, and vigilance, the Conners CPT-3 can be a useful adjunct to the process of diagnosing Attention-Deficit/Hyperactivity Disorder (AD/HD), as well as other psychological and neurological conditions related to attention.

   Whereas the CPT-3 uses visually presented cues for assessing sustained focus, the CATA assesses auditory processing and attention-related problems in individuals aged eight years and older. During the 14-minute, 200-trial administration, respondents are presented with high-tone sounds that are either preceded by a low-tone warning sound (warned trials) or played alone (unwarned trials). Respondents are instructed to respond only to high tone sounds on warned trials, and to ignore those on unwarned trials. By indexing the respondent's performance in areas of inattentiveness, impulsivity, and sustained attention, the Conners CATA can be a useful adjunct to the process of diagnosing Attention-Deficit/Hyperactivity Disorder (AD/HD) and other neurological conditions related to auditory attention.

   Used in combination, the CPT-3 and the CATA provide the best available indicator of functioning issues related to attention, impulsivity, and vigilance, irrespective of modality (visual or auditory).

   See Figures 9a-9b. The Patient's scores on the CPT-3 show that relative to the normative sample, he was less able to differentiate targets from non-targets, made more commission errors and displayed more of a reduction in response speed in later blocks. Overall, the Patient has a total of 3 atypical T-scores, which is associated with a moderate likelihood of having a disorder characterized by attention deficits, such as ADHD.

   The Patient's profile of scores and response pattern indicates that

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he may have issues related to:

- Inattentiveness (Some Indication)
- Sustained Attention (Some Indication)

See Figure 9c-9d. The Patient's scores on the CATA show that relative to the normative sample, he was less able to differentiate targets from non-targets, made more commission errors, made more perseverative errors, responded faster and displayed less consistency in response speed.

Overall, the Patient has a total of 5 atypical T-scores, which is associated with a high likelihood of having a disorder characterized by attention deficits, such as ADHD. Note that other psychological and/or neurological conditions with symptoms of impaired attention can also lead to atypical scores on the Conners CATA.

The Patient's profile of scores and response pattern indicates that he may have issues related to:

- Inattentiveness (Strong Indication)
- Impulsivity (Strong Indication)

It should be noted that other psychological and/or neurological conditions with symptoms of impaired attention could also lead to atypical scores on the CATA and CPT-3.

Overall, the results of the two continuous performance tests show evidence of the Patient experiencing difficulties in the areas of inattentiveness, sustained attention, and impulsivity and suggest a disorder of attention such as AD/HD. This is not seen in scores from the CNS-VS, indicating that any diagnosis of AD/HD would be considered mild, at most.

10. *Wisconsin Card Sorting Test (WCST):* The WCST is a test of mental flexibility associated with executive functioning. It is considered a good measure of frontal lobe functioning.

    See Figure 10. The Patient's score on the WCST show his total errors to be in the 81st percentile, his non-perseverative errors to be in the 75th percentile, and perseverative responses and perseverative errors are in the 84th and 81st percentiles, respectively. His conceptual responses are in the 75th percentile and the categories completed is in the greater than 16th percentile. In addition, he completed 6 categories and it took 10 trials to complete the first category which is within normal limits. His failure to maintain set and learning to learn were within normal limits as well.

    Overall, these results indicate that the Patient has no issues with cognitive flexibility. This is seen in average results on the cognitive flexibility domain on the CNS-VS.

11. *Raven's Progressive Matrices – Standard (RPM-S):* The RPM-S is a test of

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nonverbal reasoning, pattern matching and general cognitive functioning that is not based on language. RPM measures the two main components of general intelligence. These are executive ability, which is the ability to think clearly and make sense of complexity, and reproductive ability, which is the ability to store and reproduced information.

See Figures 11a-11b. The Raven's 2 is a nonverbal assessment of general cognitive ability, including the ability to formulate new concepts when faced with novel information, extract meaning out of confusion or ambiguity, and think clearly about complex situations and events. Contemporary cognitive assessment theory suggests that solving progressive matrices involves cognitive functions such as perception and attention to visual detail, inductive reasoning, classification and spatial ability, simultaneous processing, fluid intelligence, broad visual intelligence, and working memory.

The Patient's results on the Raven's Matrices indicate a standard score of 93 which places him in the 32nd percentile when compared to his peers. The results indicate that the Patient is in the average range with respect to pattern recognition and extrapolation, indicating no significant issues with reasoning. Nonetheless, the scores are slightly lower than other metrics for cognitive functioning and do hint at a degree of inefficiency with regard to pattern recognition and extrapolation.

12. *Conventional EEG Samples and qEEG Analyses: Raw Tracings, Amplitude Frequency Distribution and Z-Score Frequency Distribution:* See Figures 12a-12b. Raw wave morphology appears to be free of epileptiform paroxysms. The eyes-closed recording condition shows the dominant frequency peak, as is seen in the normative population.

    The spectral distributions in eyes-closed condition show amplitudes in deficit of between -2.00 standard deviations (SDs) and -3.00 SDs in left frontal regions and -2.22 SDs at T4 in the delta bandwidth and excess of +3.19 SDs at C3 in the high beta bandwidth.

13. *qEEG Summary Analyses:* The qEEG analyses were deviant from normal and showed dysregulation in left frontotemporal, left central, in parietal regions, especially the right hemisphere, and right retro-temporal region. The frontal lobes are involved in executive functioning, abstract thinking, expressive language, sequential planning, mood control, and social skills. The temporal lobes are involved in auditory information processing, short-term memory, receptive language on the left, and face recognition on the right. The parietal lobes are involved in visual-spatial information processing, short-term memory, executive attention, receptive language on the left, and empathy control and awareness of emotional expression in others on the right (e.g., prosody). To the extent there is deviation from

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normal electrical patterns in these structures, then sub-optimal functioning is expected.

14. *Surface Laplacian:* See Figures 13a-13b. The Laplacian power spectral analyses were deviant from normal with deficit power in the delta and theta bandwidths in bilateral frontotemporal regions, especially the left hemisphere and bilateral temporal regions, especially the right hemisphere. Maps also show excessive power in the theta bandwidth at Fz, in the alpha bandwidth in left parietal region, in the beta bandwidth in left central/parietal regions, frontocentral and left temporal regions, and in the high beta bandwidth in left frontocentral, at Fz, bilateral central, especially the left hemisphere, and in the alpha and high beta bandwidths in left parietal regions.
15. *Phase Slope Index:* See Figures 14a-14b. The phase slope index is a measure of directional connectivity. Areas shaded in blue are likely to be under-connected with homologous areas shaded in red.

    The Phase Slope Index in the beta and beta 3 bandwidths show disconnections between communicating right temporal and left frontal sites. *In the beta bandwidth there are disconnections between communicating bilateral frontal sites, especially the right hemisphere, between left frontal and left central sites, between left temporal and right central/parietal sites, and between bilateral occipital and left central sites. There are disconnections between communicating right frontal and left frontal sites, between bilateral frontal and bilateral parietal, especially the left hemisphere, and between right occipital and bilateral central sites in the beta 3 bandwidth.*
16. *Electrical NeuroImaging and Brain Brodmann Regions:* See Figure 15. Linking a Patient's symptoms and complaints to functional systems in the brain is important in evaluating the health and efficiency of cognitive and perceptual functions.
17. *NeuroImaging:* The functional attributes of the Brodmann areas impacted are shown below each standardized weighted LORETA (swLORETA) image. The NeuroNavigator provides advanced tools to effortlessly explore the electrical activity of your brain and links symptoms to dysregulation in brain networks.

    See Figures 16a-16i. Figures show dysregulation (deficit) at 01 Hz in the following networks: Hagmann 6(Executive & Social Skills), Addiction/Reward, Mood, and Pleasure. Figures also show dysregulation (excess) at 24 Hz in the following networks: Hagmann 3 (Auditory, Language, & Memory) and Autism Spectrum Disorder (ASD). A functional connectivity analyses for 01 Hz and 24 Hz is also provided (see Figures 16h & 16i).

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18. *qEEG: Discriminant Analyses:* See Figure 17. The traumatic brain injury discriminant predicts the Patient has an insignificant probability of having experienced a mild traumatic brain injury.
19. Concussion Index (CI): This is a way to track brain network connectivity changes over time and following treatment.

    See Figure 18. The concussion index was deemed poor and shows mild to moderate deficits in functioning in the Anxiety Network and mild deficits in the Default and Mood Networks. These results align strongly with the areas in which the Patient experiences and exhibits the most difficulties.

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Summary of Results and Diagnosis

- The BAI and BDI-II show a minimal, non-clinical level of anxiety and depression.
- The CEFI-Adult is consistent with the Patient feeling he struggles with initiation and possibly some attention issues while his father feels the Patient struggles with many areas of executive functioning including initiation, organization, planning, self-monitoring, and working memory.
- The GADS indicate a high/probable probability for the disorder formerly known as Asperger's Disorder, now referred to as high functioning Autism Spectrum Disorder (ASD).
- The PAI show moderate elevations on the paranoid, schizophrenia (thought disorder), depression and somatic domains. Specifically, resentment (PAR-R), social detachment (SCZ-S), health concerns (SOM-H), cognitive depression (DEP-C), hypervigilance (PAR-H), thought disorder (SCZ-T), somatization (SOM0S), affective and physiological depression (DEP-A & DEP-P), negative relationships (BOR-N), and egocentricity (ANT-E). The Patient also reports that alcohol use has caused occasional problems in his life. These problems may involve difficulties in interpersonal relationships, problems on the job, and/or the use of alcohol to reduce stress.
- The SPECTRA indicate the Patient is experiencing issues in several areas of neuropsychiatric pathology which agree with his PAI profile and are therefore considered conclusive. Among the areas we see as consistent across measures are concerns with cognitive functioning and physical health, minimal to mild depression and anxiety, and thought disorder.
- The TSI-2 is consistent with the Patient having experienced and been impacted by instances of traumatic exposure; however, he does not meet the criteria for Posttraumatic stress disorder. Nonetheless, elevated somatic concerns and symptoms associated with depression and anxiety are consistent with other results, and likely to interfere with physiological functioning. These results are also seen in results from the PAI.
- The CNS-VS indicate an average neurocognitive index with no issues in executive functioning.
- The results of the two continuous performance tests, the CATA & CPT-3, show evidence of the Patient experiencing difficulties in the areas of inattentiveness, sustained attention, and impulsivity and suggest a disorder of attention such as AD/HD. This is not seen in scores from the CNS-VS.
- The WCST indicate that the Patient has no issues with cognitive flexibility. This is seen in average results on the cognitive flexibility domain on the CNS-VS.

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- The RPM-S indicate that the Patient is in the average range with respect to pattern recognition and extrapolation. Nonetheless, the scores are slightly lower than other metrics for cognitive functioning and do hint at a degree of inefficiency with regard to pattern recognition and extrapolation.

Overall, these tests indicate a young adult with an average level of neurocognitive functioning. None of the tests of executive functioning show demonstrable deficits, other than a mild weakness with pattern identification and extrapolation. The low average scores in executive functioning on the CNS-VS are likely due to his meeting the criteria for mild AD/HD per the two continuous performance tests. On the other hand, results from the CEFI and from the intake do reveal weakness with respect to initiation, motivation, and attention. The Patient's father feels the Patient struggles with many areas of executive functioning including initiation, organization, planning, self-monitoring, and working memory. The Patient does not appear to have any issues associated with cognitive flexibility.

Results from the PAI suggest and he confirms minimal clinical symptom levels associated with anxiety and depression, resentment, social detachment, health concerns, hypervigilance, somatization, mild affective and physiological depression, negative relationships, and egocentricity. The SPECTRA confirm possible issues/concerns with cognitive functioning and physical health, and minimal to mild depression and anxiety. The Patient does not meet the full criteria for PTSD; however, he may be struggling in some areas associated with sexual disturbance and dysfunction which are likely interfering with interpersonal functioning. Lastly, there is a high/probable probability for the disorder formerly known as Asperger's Disorder, now referred to as high functioning Autism Spectrum Disorder (ASD).

The Patient's brain mapping study shows markers for difficulties with respect to:

- Dysregulation in the left frontotemporal, left central, in parietal regions, especially the right hemisphere, and right retro-temporal region. Deficits in left frontotemporal region are indicative of mild executive functioning issues. Deficits in the parietal, temporal, and occipital areas result in issues involving the emotional valence of thoughts and behaviors, anxiety, as well as issues with distractibility (Thompson & Thompson, 2015). These are issues the Patient continues to struggle with. Temporal lobes also play a large role on the integration and comprehension of new information (Thompson & Thompson, 2015).

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- Specifically, there is deficit power in the delta and theta bandwidths in bilateral frontotemporal regions, especially the left hemisphere and bilateral temporal regions, especially the right hemisphere. Maps also show excessive power in the theta bandwidth at Fz, in the alpha bandwidth in left parietal region, in the beta bandwidth in left central/parietal regions. This finding is often associated with mood instability and with executive functioning issues.
- Atypical EEG coherence and EEG phase measures of functional connectivity in all lobes. Hypercoherence was present in right frontal, central, and temporal regions which indicates reduced functional differentiation. Hypocoherence was present in frontal, central, temporal, parietal and occipital regions which indicates reduced functional connectivity. This finding is often associated with mild neurocognitive impairment and/or regulation of mood.
- Aberrations in swLORETA showing dysregulation (deficit) at 01 Hz in the following networks: Hagmann 6(Executive & Social Skills), Addiction/Reward, Mood, and Pleasure. Figures also show dysregulation (excess) at 24 Hz in the following networks: Hagmann 3 (Auditory, Language, & Memory) and Autism Spectrum Disorder (ASD).
- To the extent there is deviation from normal electrical patterns in these structures, then sub-optimal functioning is expected.

The overall pattern is of dysregulation in the areas of the cerebral cortex associated with arousal, attention, mood, and social interactions. His pattern is one of mood instability, some mild symptoms associated with anxiety and depression, and (typically) mild issues with interpersonal functioning.

We find that the Patient meets the diagnostic criteria for:

314.01(F90.2)	Attention Deficit Hyperactivity Disorder, combined presentation.
V62.81	Relational Problem NOS (Family or Marital Problem)
F43.23	Adjustment Disorder with mixed anxiety and depressed mood

In our opinion, the criteria for these diagnoses are independently met across multiple sources of data.

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Treatment Recommendations

Neurotherapy is recommended due to the focal nature of the findings, and to a demonstrated history of success in treating clients with the Patient's symptomatology and presenting issues. When The Patient's brain maps were matched against the symptoms associated with the Hagmann 6(Executive & Social Skills), Hagmann 3 (Attention, Working Memory), Hagmann 4 (Auditory, Language, Memory), Addiction/Reward, Mood, Pleasure and Autism Spectrum Disorder (ASD)[1] in the NeuroGuide symptom check list, a majority of the areas of the brain associated with The Patient's presenting issues strongly met criteria:

Given this strong match between his history, symptoms, and brain dysregulations there is a high probability that the Patient would benefit from a program of multi-modal neurotherapy.

1 1 The Hagmann Networks (see Hagmann et al. 2008) are a subset of the three proposed canonical brain networks (Goldberg 2018) These six networks are also sometimes referred to as a rich club of brain networks (Gallo et al. 2015). The six Hagmann networks are among the most interconnected brain networks that can be reasonably well associated with discrete brain functions. The Hagmann hubs further reinforce Goldberg's (2018) work on the extraordinary prevalence of hemispheric specialization across the evolutionary record. The six Hagmann hubs address in order 1 to 6 respectively vision (Module 1) broad attention (Module 2) left hemisphere auditory and memory functions (including language) (Module 3) right hemisphere auditory and memory functions (Module 4) the left prefrontal executive network (Module 5) and the right prefrontal executive network (Module 6).

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We recommend two modalities of therapy for the Patient. First, given history of epilepsy (now in remission) and of concussive injury, neurotherapy is recommended due to the focal nature of the findings, and to a demonstrated history of success in treating clients with the Patient's symptomatology and presenting issues. A regime of 25-35 sessions of multi-modal neurotherapy is suggested to address the aberrations in amplitude, connectivity, and local source density that we believe are directly associated with his presenting conditions.

Second, we recommend treatment include sessions focused on individual counseling and/or family counseling to assist the Patient with issues related to mood, self-concept, and aspects of executive functioning related to initiation, organization, planning and agency. The role of his family of origin in his ability to make adjustments deemed important to addressing these issues will be central to counseling sessions. Also addressed will be reinforcing positive behaviors in the client, in pursuit of a positive therapeutic outcome.

A successful multimodal therapy program is dependent on client responsibility and constructive feedback. We look forward to working with the Patient's family in the Patient's neurotherapy program.

Respectfully submitted and electronically signed.

William A. Lambos

William A. Lambos, Ph.D.,
Licensed Psychologist, BCN

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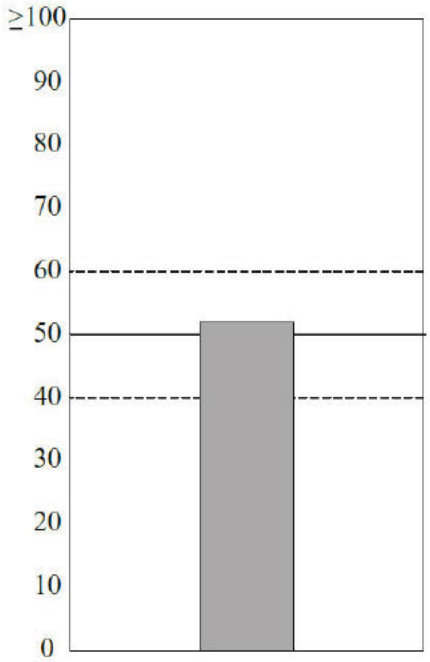
Appendix I

ASSESSMENT RESULTS

The following graph and table presents the client's *T* score, which is based on the norm for a non-clinical sample. This information may be useful in estimating the severity of the client's symptoms relative to this group. *T* scores of 50 are average for the group (standard deviation = 10 *T* score points).



Raw Score:	6
T Score (Plotted):	52
Percentile Rank:	76
Diagnostic Range:	Minimal

Figure 1a, BAI, t-score graph

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INTERPRETATION

[redacted] endorses relatively few symptoms associated with anxiety. To prevent premature termination of treatment, however, he should be questioned regarding possible underrepresentation of pathology.

For a statistically significant* change to have occurred, the patient's subsequent BAI score must be above 10 or below 1.

*90% confidence level, controlling for regression to the mean and the reliability of the test.

ENDORSED ITEMS

[redacted] endorses the following subjective and panic-related symptoms of anxiety on the BAI:

4. Unable to relax. (Mild)
10. Nervous. (Mild)

He endorses the following somatic symptoms of anxiety on the BAI:

2. Feeling hot. (Severe)
18. Indigestion or discomfort in abdomen. (Mild)

Figure 1b, BAI, Summary/ Interpretation

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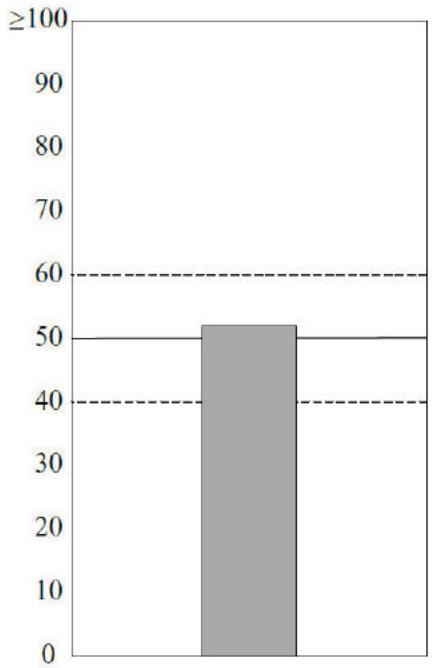
ASSESSMENT RESULTS

The following graph and table presents the client's *T* score, which is based on the norm for a non-clinical sample. This information may be useful in estimating the severity of the client's symptoms relative to this group. *T* scores of 50 are average for the group (standard deviation = 10 *T* score points).



Raw Score:	7
T Score (Plotted):	52
Percentile Rank:	72.8
Diagnostic Range:	Minimal

Figure 2a, BDI, t-score graph

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INTERPRETATION

[redacted] denies suicide ideation by endorsing the following BDI-II statement:

- I don't have any thoughts of killing myself.

Additionally, on the BDI-II he endorses very few symptoms associated with depression. This lack of depressive symptomatology is consistent with the denial of suicide ideation. To prevent premature termination of treatment, however, the patient should be questioned regarding possible underrepresentation of pathology.

For a statistically significant* change to have occurred, the patient's subsequent BDI-II score must be above 12 or below 2.

*90% confidence level, controlling for regression to the mean and the reliability of the test.

ENDORSED ITEMS

[redacted] endorses the following statements on the BDI-II:

Mild

4. I don't enjoy things as much as I used to.
8. I am more critical of myself than I used to be.
12. I am less interested in other people or things than before.
13. I find it more difficult to make decisions than usual.
16. I sleep somewhat less than usual.
18. My appetite is somewhat less than usual.
19. I can't concentrate as well as usual.

Minimal

1. I do not feel sad.
2. I am not discouraged about my future.
3. I do not feel like a failure.
5. I don't feel particularly guilty.
6. I don't feel I am being punished.
7. I feel the same about myself as ever.
9. I don't have any thoughts of killing myself.
10. I don't cry anymore than I used to.
11. I am no more restless or wound up than usual.
14. I do not feel I am worthless.
15. I have as much energy as ever.
17. I am no more irritable than usual.
20. I am no more tired or fatigued than usual.
21. I have not noticed any recent change in my interest in sex.

Figure 2b, BDI, Summary/ Interpretation

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Overview of Results for [redacted]

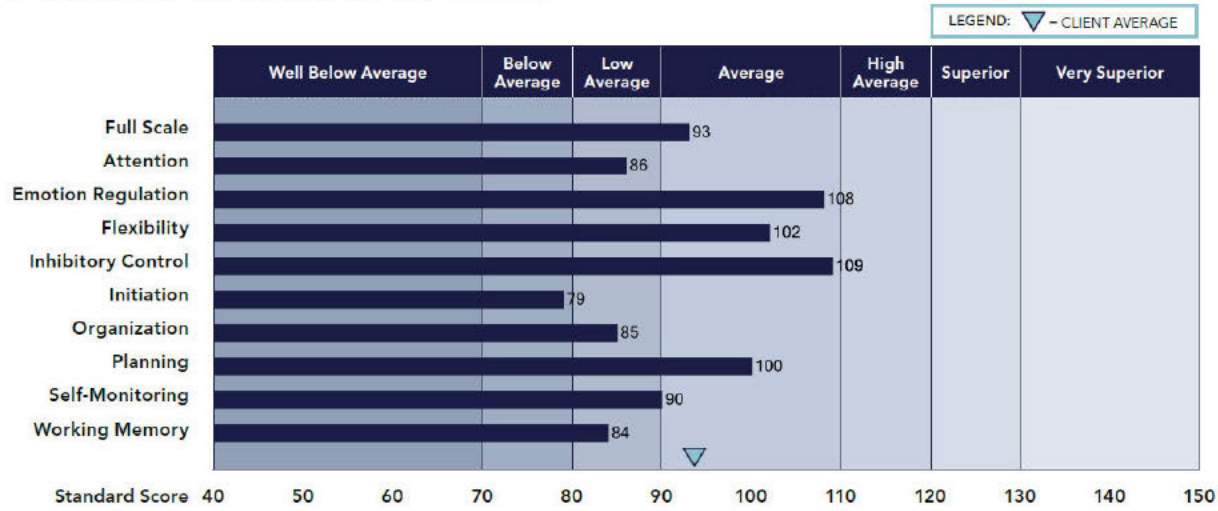

Figure 3a, CEFI-Adult, Self

Full Scale			
Standard Score	90% Confidence Interval	Percentile Rank	Classification
93	89-97	32	Average

CEFI Adult Scales							
Scale	Standard Score	90% Confidence Interval	Percentile Rank	Classification	Difference from Average (93.7)	Statistically Significant? (p < .05)	Executive Function Strength/Weakness
Attention	86	79-100	18	Low Average	-7.7	No	-
Emotion Regulation	108	96-117	70	Average	14.3	Yes	-
Flexibility	102	93-111	55	Average	8.3	No	-
Inhibitory Control	109	97-117	73	Average	15.3	Yes	-
Initiation	79	73-92	8	Below Average	-14.7	Yes	Weakness
Organization	85	79-96	16	Low Average	-8.7	No	-
Planning	100	90-110	50	Average	6.3	No	-
Self-Monitoring	90	83-101	25	Average	-3.7	No	-
Working Memory	84	78-99	14	Low Average	-9.7	No	-

Figure 3b, CEFI-Adult, Self, Interpretation

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Overview of Results for [redacted]

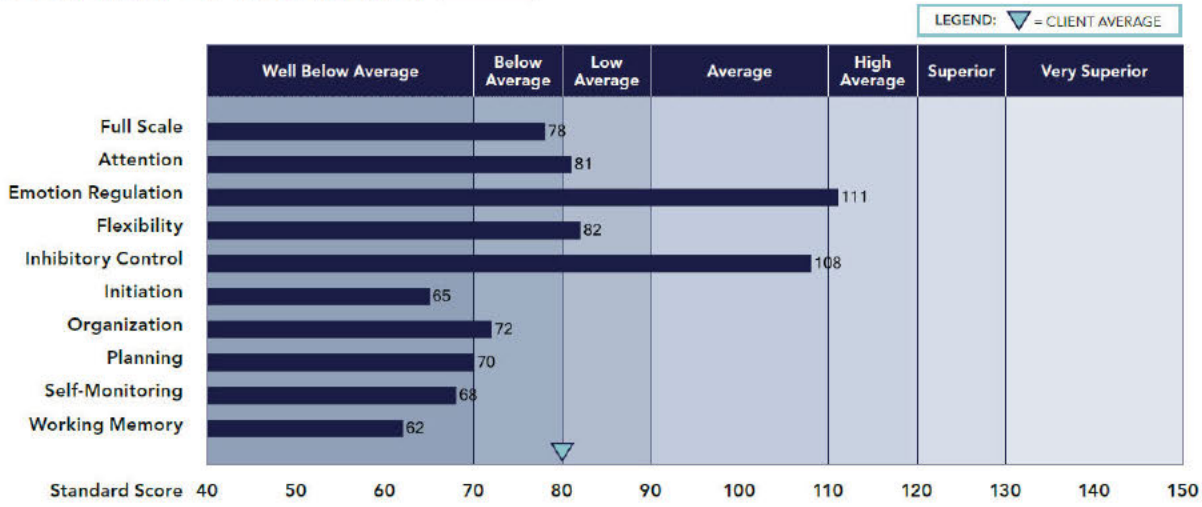

Figure 3c, CEFI-Adult, Observer

Full Scale			
Standard Score	90% Confidence Interval	Percentile Rank	Classification
78	75-81	7	Below Average

CEFI Adult Scales							
Scale	Standard Score	90% Confidence Interval	Percentile Rank	Classification	Difference from Average (79.9)	Statistically Significant? ($p < .05$)	Executive Function Strength/Weakness
Attention	81	75-92	10	Low Average	1.1	No	-
Emotion Regulation	111	103-117	77	High Average	31.1	Yes	Strength
Flexibility	82	77-90	12	Low Average	2.1	No	-
Inhibitory Control	108	100-114	70	Average	28.1	Yes	-
Initiation	65	61-74	1	Well Below Average	-14.9	Yes	Weakness
Organization	72	68-81	3	Below Average	-7.9	Yes	Weakness
Planning	70	66-79	2	Below Average	-9.9	Yes	Weakness
Self-Monitoring	68	64-80	2	Well Below Average	-11.9	Yes	Weakness
Working Memory	62	58-73	1	Well Below Average	-17.9	Yes	Weakness

Figure 3d, CEFI-Adult, Observer, Interpretation

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GADS Summary/ Response Booklet

Gilliam Asperger's Disorder Scale

Section I. Identifying Information

Name [redacted]
Address
Parents'/Guardians' Names
School
Examiner's Name [redacted]

Male ☑ Female ☐
Examiner's Title [redacted]
Rater's Name Self

	Year	Month	Day
Date of GADS Rating	2020	10	14
Subject's Date of Birth	2001	05	13
Subject's Age	19	5	

Section II. Score Summary

Subscales	Raw Score	SS	%ile Rank	SEM
Social Interaction	14	4	2	1
Restricted Patterns of Behavior	12	8	25	1
Cognitive Patterns	13	9	37	1
Pragmatic Skills	13	9	37	1
Sum of Standard Scores		30		
Asperger's Disorder Quotient		83	13	4

Section III. Interpretation Guide

Asperger's Disorder Quotient	Probability of Asperger's Disorder
≥80	High/Probable
70–79	Borderline
≤69	Low/Not Probable

Section IV. Profile of Scores

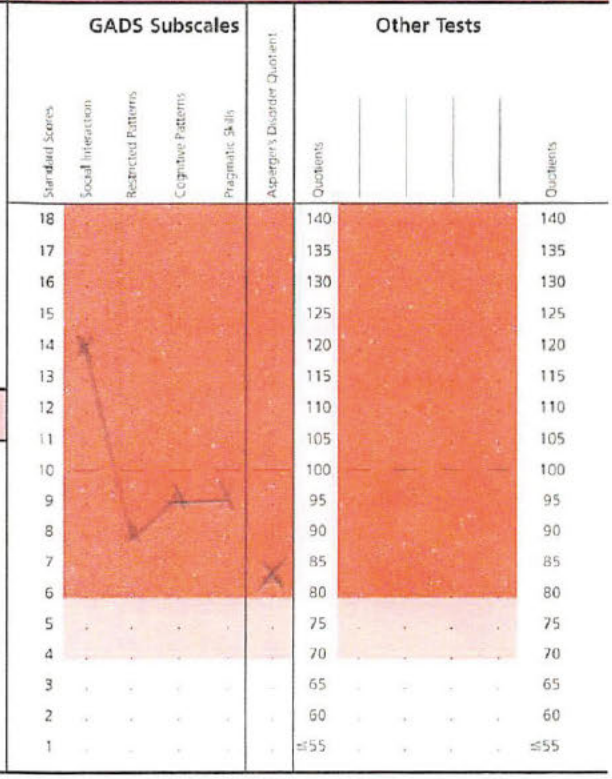

Figure 4a, GADS, Profile Scores, Self

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GADS Summary/ Response Booklet

Gilliam Asperger's Disorder Scale

Section I. Identifying Information

Name [redacted]
Male ☑ Female ☐
Rater's Examiner's Title Father
Address
Examiner's Rater's Name [redacted]
Parents'/Guardians' Names [redacted]

	Year	Month	Day
Date of GADS Rating	2020	10	14
Subject's Date of Birth	2001	05	13
Subject's Age	19	5	

School
Rater's Examiner's Name [redacted]

Section II. Score Summary

Subscales	Raw Score	SS	%ile Rank	SEM
Social Interaction	17	6	9	1
Restricted Patterns of Behavior	18	12	75	1
Cognitive Patterns	5	3	1	1
Pragmatic Skills	11	8	25	1
Sum of Standard Scores		29		
Asperger's Disorder Quotient		82	12	4

Section III. Interpretation Guide

Asperger's Disorder Quotient	Probability of Asperger's Disorder
≥80	High/Probable
70–79	Borderline
≤69	Low/Not Probable

Section IV. Profile of Scores

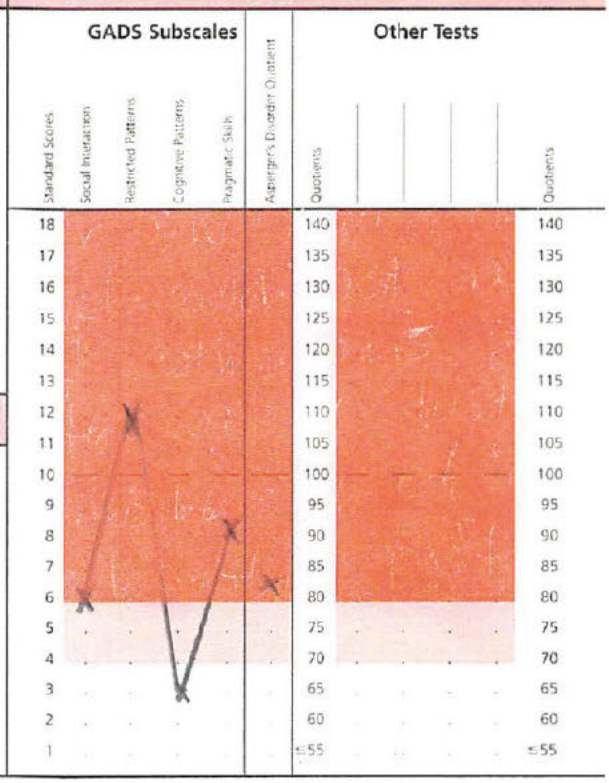

Figure 4b, GADS, Profile Scores, Father

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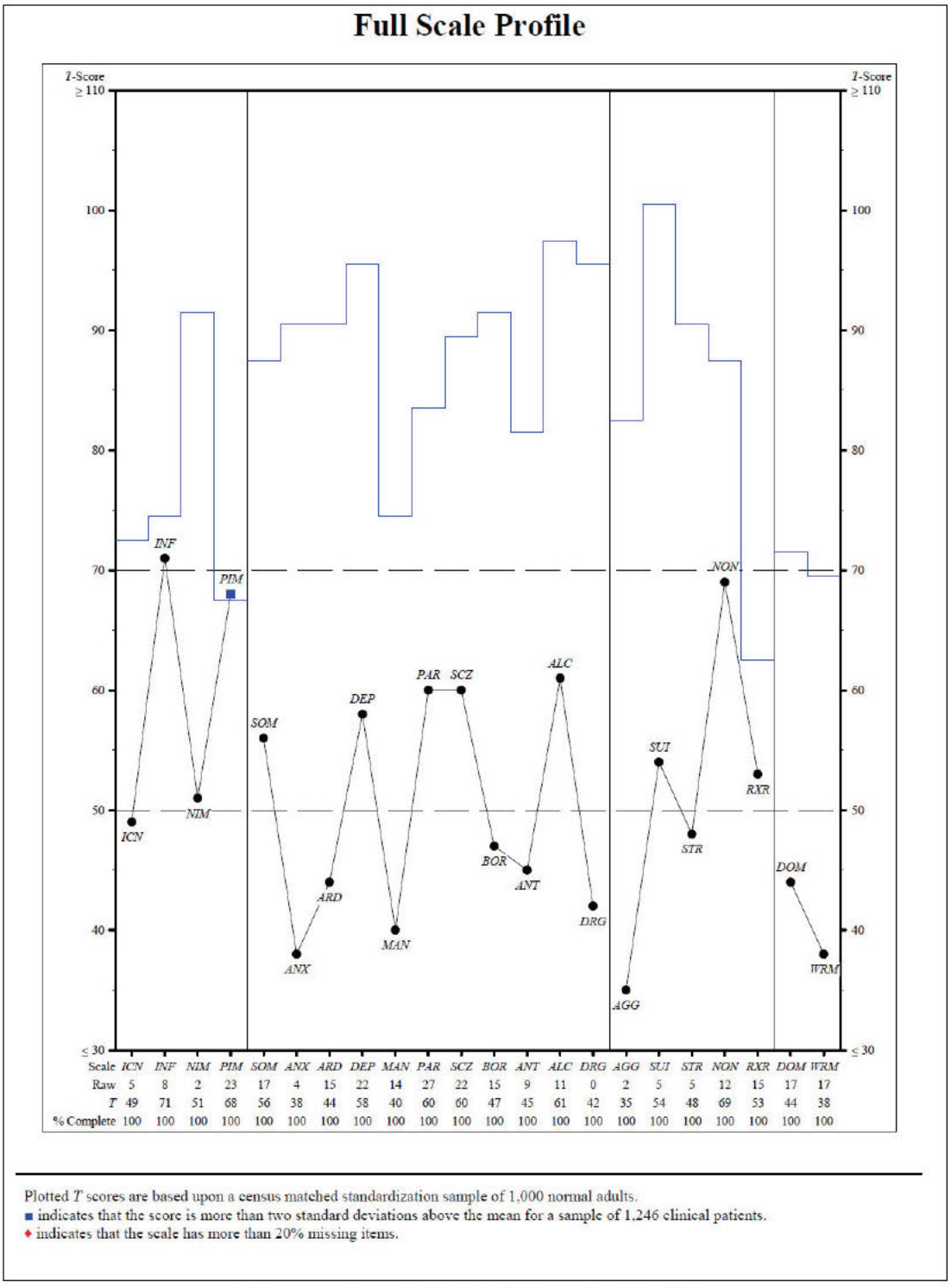

Figure 5a, PAI, Full Scale Profile

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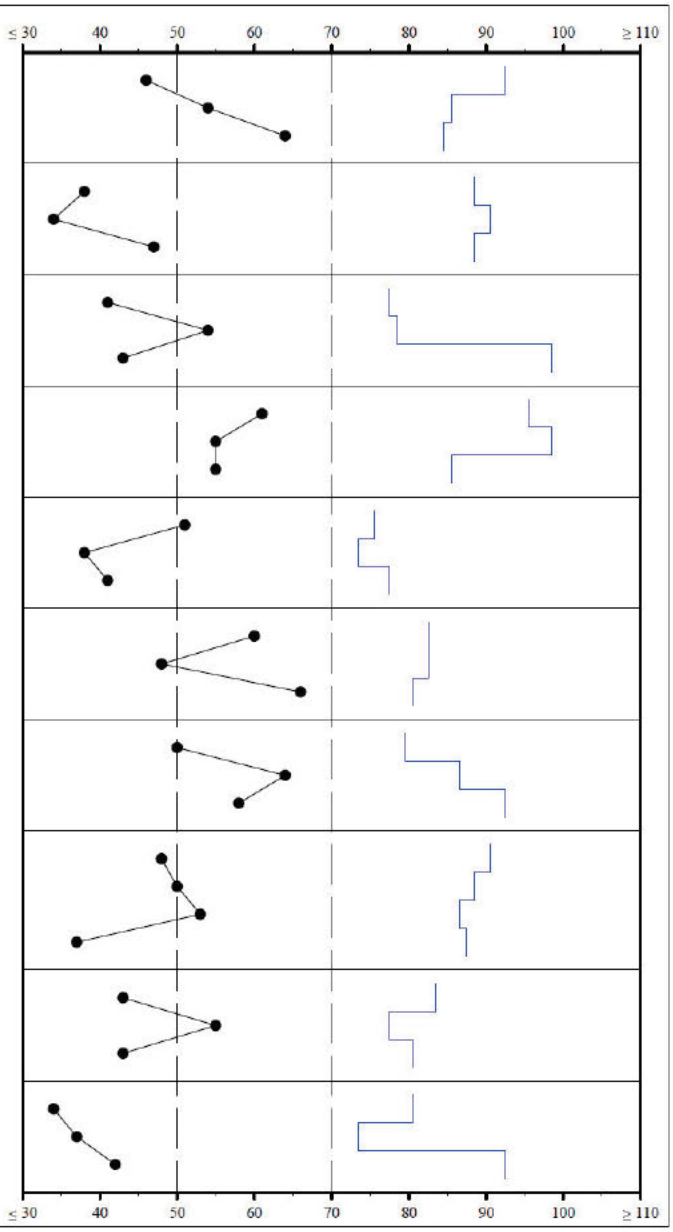
Subscale Profile

		Score Raw	Score T
SOM-C	Conversion	1	46
SOM-S	Somatization	6	54
SOM-H	Health Concerns	10	64
ANX-C	Cognitive	1	38
ANX-A	Affective	0	34
ANX-P	Physiological	3	47
ARD-O	Obsessive-Compulsive	6	41
ARD-P	Phobias	8	54
ARD-T	Traumatic Stress	1	43
DEP-C	Cognitive	8	61
DEP-A	Affective	6	55
DEP-P	Physiological	8	55
MAN-A	Activity Level	7	51
MAN-G	Grandiosity	3	38
MAN-I	Irritability	4	41
PAR-H	Hypervigilance	11	60
PAR-P	Persecution	3	48
PAR-R	Resentment	13	66
SCZ-P	Psychotic Experiences	4	50
SCZ-S	Social Detachment	11	64
SCZ-T	Thought Disorder	7	58
BOR-A	Affective Instability	4	48
BOR-I	Identity Problems	5	50
BOR-N	Negative Relationships	6	53
BOR-S	Self-Harm	0	37
ANT-A	Antisocial Behaviors	2	43
ANT-E	Egocentricity	5	55
ANT-S	Stimulus-Seeking	2	43
AGG-A	Aggressive Attitude	0	34
AGG-V	Verbal Aggression	2	37
AGG-P	Physical Aggression	0	42



Missing Items = 0

Plotted *T* scores are based upon a census matched standardization sample of 1,000 normal adults.
■ indicates that the score is more than two standard deviations above the mean for a sample of 1,246 clinical patients.
♦ indicates that the scale has more than 20% missing items.

Figure 5b, PAI, Subscale Profile

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SPECTRA Score Summary Table

Validity scale	Raw score	Percentile	Protocol classification
Infrequency (INF)	3	≤98	Acceptable

Response style indicator	Raw score	Percentile	Protocol classification
Profile Classification Index (PCI)	0	≤98	Acceptable

Scale/spectrum/GPI	Raw score	*T* score	90% CI
Depression (DEP)	9	55	49 - 61
Anxiety (ANX)	8	40	35 - 45
Social Anxiety (SOC)	10	55	50 - 60
Post-Traumatic Stress (PTS)	12	57	52 - 62
Internalizing Spectrum (INT)	39	55	52 - 58
Alcohol Problems (ALC)	6	43	37 - 49
Severe Aggression (AGG)	6	41	36 - 46
Antisocial (ANTI)	8	40	32 - 48
Drug Problems (DRG)	6	44	38 - 50
Externalizing Spectrum (EXT)	26	41	36 - 46
Psychosis (PSY)	6	42	33 - 51
Paranoid Ideation (PAR)	6	42	36 - 48
Manic Activation (MAN)	7	55	45 - 65
Grandiose Ideation (GRA)	9	46	39 - 53
Reality-Impairing Spectrum (RI)	28	46	40 - 52
General Psychopathology Index (GPI)	93	50	47 - 53

Supplemental scale	Raw score	*T* score	90% CI
Cognitive Concerns (COG)	9	58	49 - 67
Psychosocial Functioning (PF)	29	44	37 - 51
Suicidal Ideation (SUI)	6	43	36 - 50

Figure 6a, SPECTRA, Score Summary Table

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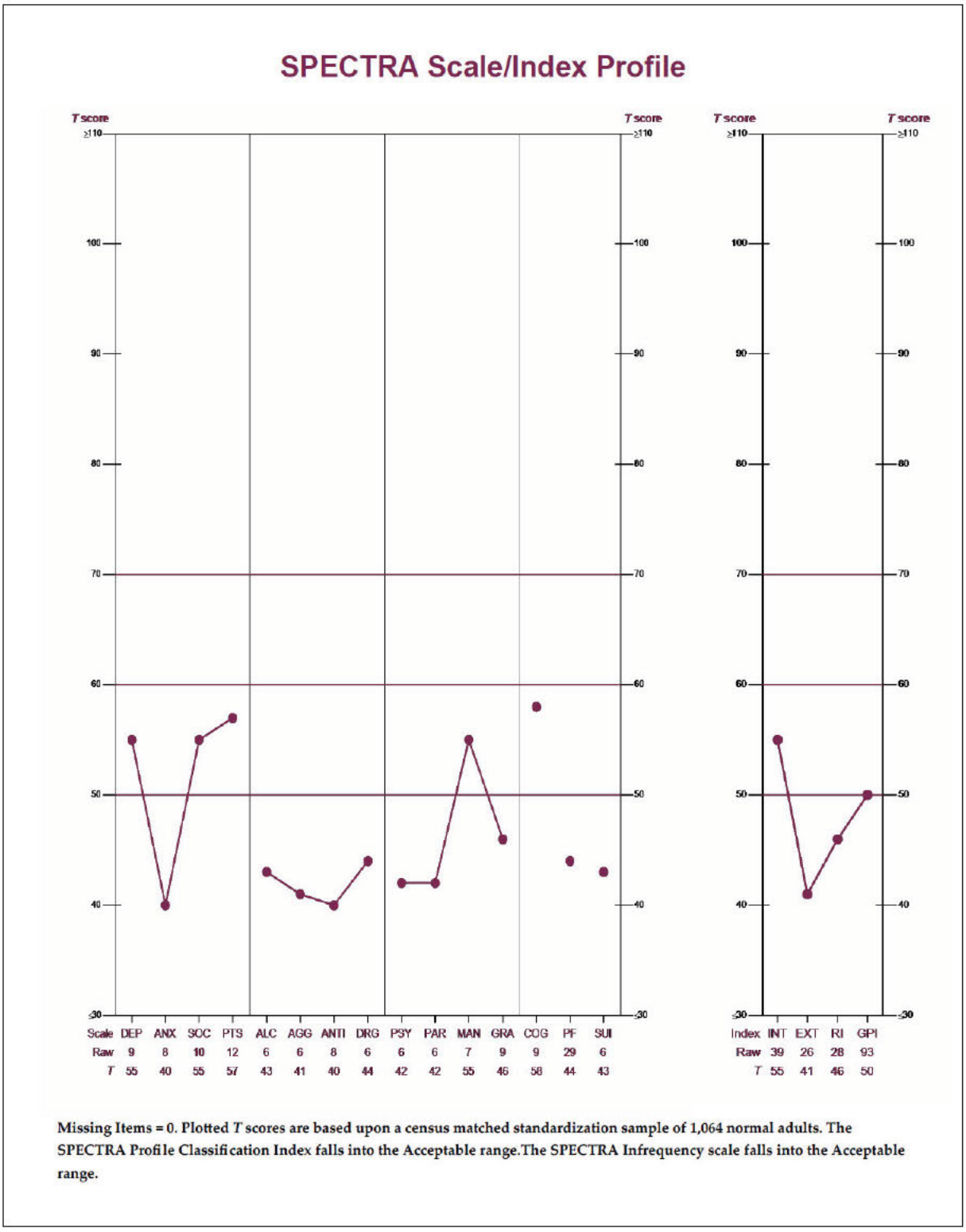

Figure 6b, SPECTRA, Scale/Index Profile

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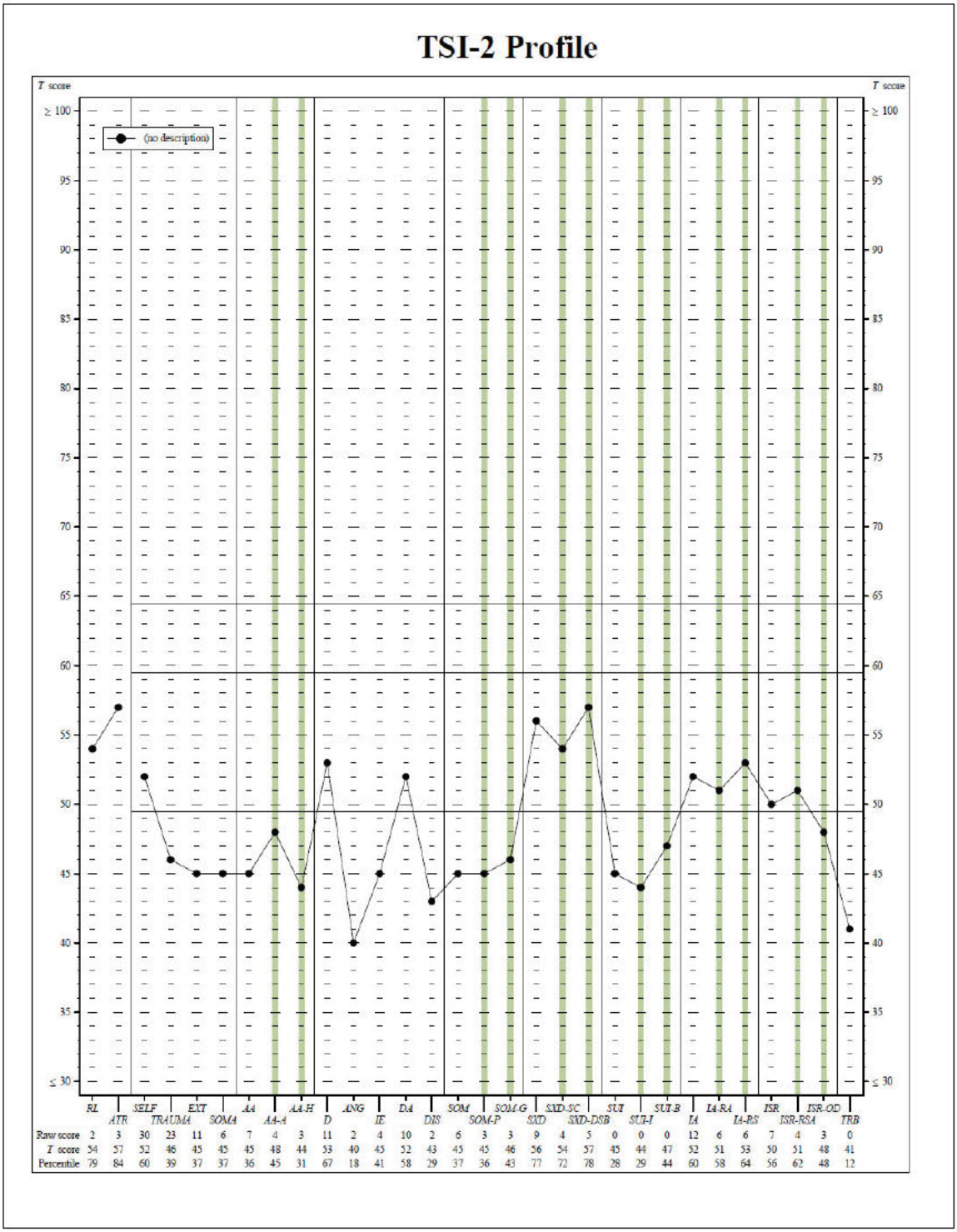

Figure 7a, TSI-2 Profile

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TSI-2 Critical Items

Item	Score	Item description
23	2*	Having sex with someone you hardly knew
24	0	Attempting suicide
52	0	Intentionally overdosing on pills or drugs
80	0	Trying to kill yourself, but then changing your mind
87	0	Thoughts or fantasies about hurting someone
97	0	Doing something violent because you were so upset
124	0	Intentionally hurting yourself (for example, by scratching, cutting, or burning) as a way to stop upsetting thoughts or feelings
133	0	Trying to end your life

Note: * = A critical item was endorsed which may require immediate intervention.

Figure 7b, TSI-2 Critical Items

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TSI-2 Validity and Clinical Scales

Scale / subscale	Raw score	*T* score	%ile
Validity scale			
Response Level (RL)	2	54	79
Atypical Response (ATR)	3	57	84
Clinical scale / subscale			
Anxious Arousal (AA)	7	45	36
Anxiety (AA-A)	4	48	45
Hyperarousal (AA-H)	3	44	31
Depression (D)	11	53	67
Anger (ANG)	2	40	18
Intrusive Experiences (IE)	4	45	41
Defensive Avoidance (DA)	10	52	58
Dissociation (DIS)	2	43	29
Somatic Preoccupations (SOM)*	6	45	37
Pain (SOM-P)	3	45	36
General (SOM-G)	3	46	43
Sexual Disturbance (SXD)	9	56	77
Sexual Concerns (SXD-SC)	4	54	72
Dysfunctional Sexual Behavior (SXD-DSB)	5	57	78
Suicidality (SUI)	0	45	28
Ideation (SUI-I)	0	44	29
Behavior (SUI-B)	0	47	44
Insecure Attachment (IA)	12	52	60
Relational Avoidance (IA-RA)	6	51	58
Rejection Sensitivity (IA-RS)	6	53	64
Impaired Self-Reference (ISR)	7	50	56
Reduced Self-Awareness (ISR-RSA)	4	51	62
Other-Directedness (ISR-OD)	3	48	48
Tension Reduction Behavior (TRB)	0	41	12

* SOM clinical scale = SOMA factor.

Figure 7c, TSI-2 Scales

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CNS Vital Signs Report	Test Date: October 14, 2020 12:48:14
Patient ID: [redacted]	Administrator: administrator
Age: 19	Language: English (United States)
Total Test Time: 41:47 (min:secs)	Version 4.0.93

Patient Profile	Percentile Range				> 74	25 - 74	9 - 24	2 - 8	< 2
	Standard Score Range				> 109	90 - 109	80 - 89	70 - 79	< 70
Domain Scores	**Subject Score**	**Standard Score**	**Percentile**	**Valid Score****	**Above**	**Average**	**Low Average**	**Low**	**Very Low**
Neurocognition Index (NCI)		96	40	Yes		x			
Composite Memory	98	95	37	Yes		x			
Verbal Memory	53	102	55	Yes		x			
Visual Memory	45	93	32	Yes		x			
Psychomotor Speed	168	95	37	Yes		x			
Reaction Time*	575	110	75	Yes	x				
Complex Attention*	11	92	30	Yes		x			
Cognitive Flexibility	39	90	25	Yes		x			
Processing Speed	64	104	61	Yes		x			
Executive Function	40	89	23	Yes			x		
Social Acuity	9	103	58	Yes		x			
Reasoning	9	106	66	Yes		x			
Working Memory	9	95	37	Yes		x			
Sustained Attention	31	103	58	Yes		x			
Simple Visual Attention	39	100	50	Yes		x			
Motor Speed	104	91	27	Yes		x			

Figure 8, CNS-VS, Patient Profile

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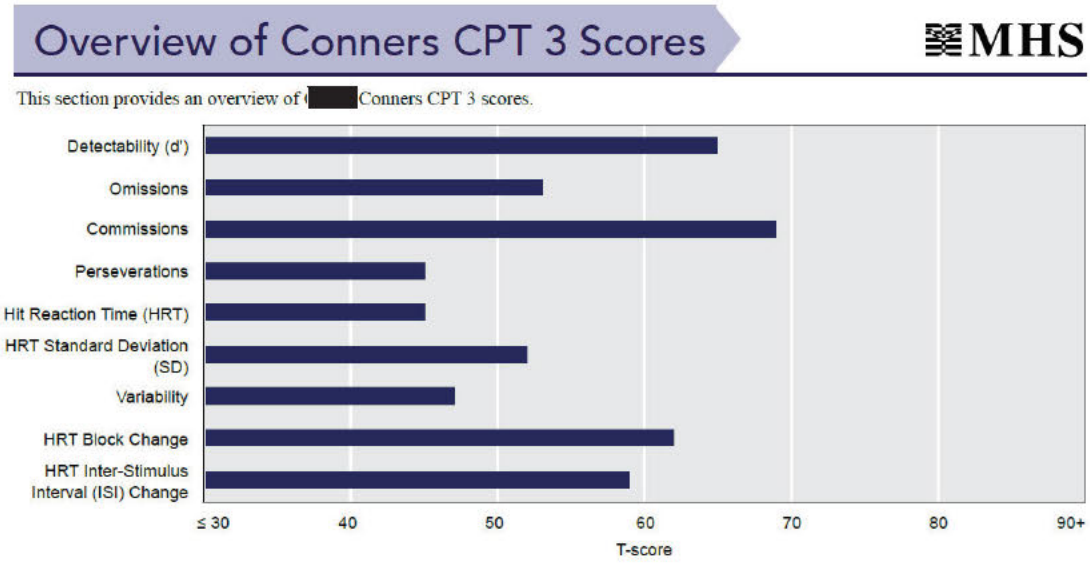

Figure 9a, CPT-3, Overview

Variable Type	Measure	T-score	Guideline	Interpretation
Detectability	d'	65	Elevated	**Difficulty** differentiating targets from non-targets.
Error Type	Omissions	53	Average	**Average** rate of missed targets.
	Commissions	69	Elevated	**High** rate of incorrect responses to non-targets.
	Perseverations	45	Average	**Average** rate of random, repetitive, or anticipatory responses.
Reaction Time Statistics	HRT	45	Average	**Average** mean response speed.
	HRT SD	52	Average	**Average consistency** in reaction times.
	Variability	47	Average	**Average** variability in reaction time consistency.
	HRT Block Change	62	Elevated	**Substantial** reduction in response speed in later blocks.
	HRT ISI Change	59	High Average	**Slight** reduction in response speed at longer ISIs.

Summary: Relative to the normative sample, [redacted] was less able to differentiate targets from non-targets, made more commission errors and displayed more of a reduction in response speed in later blocks.

Overall, [redacted] has a total of 3 atypical T-scores, which is associated with a moderate likelihood of having a disorder characterized by attention deficits, such as ADHD. Note that other psychological and/or neurological conditions with symptoms of impaired attention can also lead to atypical scores on the Conners CPT 3.

[redacted] profile of scores and response pattern indicates that he may have issues related to:
• **Inattentiveness (Some Indication)** • **Sustained Attention (Some Indication)**

Figure 9b, CPT-3, Interpretation

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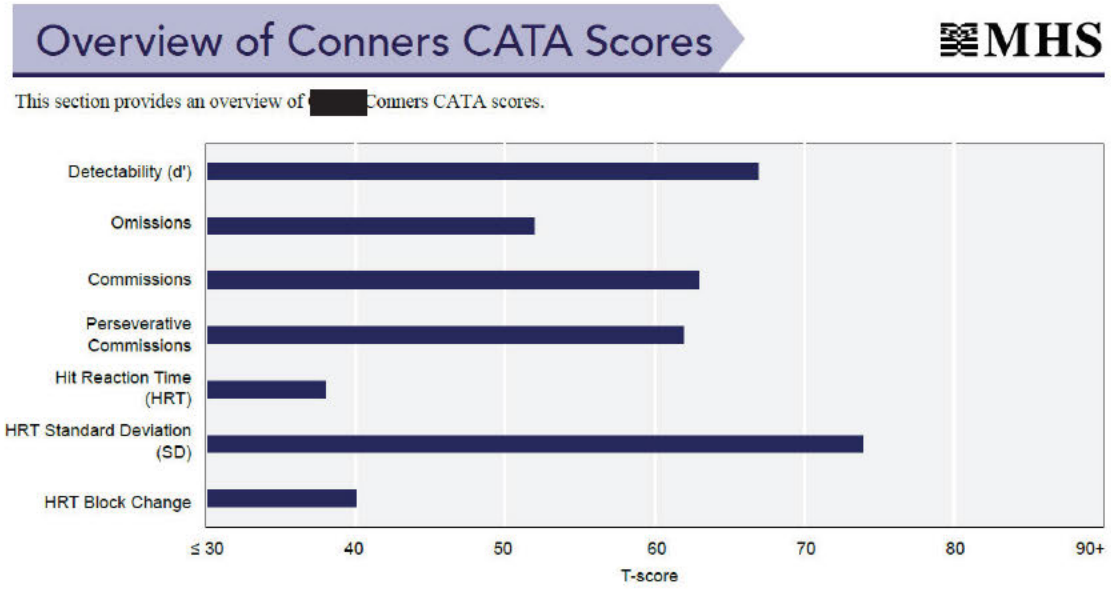

Figure 9c, CATA, Overview

Variable Type	Measure	T-score	Guideline	Interpretation
Detectability	d'	67	Elevated	**Difficulty** differentiating targets from non-targets.
Error Type	Omissions	52	Average	**Average** rate of missed targets.
	Commissions	63	Elevated	**High** rate of incorrect responses to non-targets.
	Perseverative Commissions	62	Elevated	**High** rate of incorrectly responding before the target.
Reaction Time Statistics	HRT	38	Atypically Fast	**Very Fast** mean response speed.
	HRT SD	74	Very Elevated	**Very high inconsistency** in reaction times.
	HRT Block Change	40	Low	**Showed a good ability** to sustain or increase response speed in later blocks.

Summary: Relative to the normative sample, [redacted] was less able to differentiate targets from non-targets, made more commission errors, made more perseverative errors, responded faster and displayed less consistency in response speed.

Overall, [redacted] has a total of 5 atypical T-scores, which is associated with a high likelihood of having a disorder characterized by attention deficits, such as ADHD. Note that other psychological and/or neurological conditions with symptoms of impaired attention can also lead to atypical scores on the Conners CATA.

[redacted] profile of scores and response pattern indicates that he may have issues related to:
• **Inattentiveness (Strong Indication)** • **Impulsivity (Strong Indication)**

Figure 9d, CATA, Interpretation

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Test Results

WCST scores	Raw scores	Age-corrected Standard scores	Age-corrected *T* scores	Age-corrected %iles
Trials Administered	91			
Total Correct	78			
Total Errors	13	113	59	81%
% Errors	14%	115	60	84%
Perseverative Responses	7	115	60	84%
% Perseverative Responses	8%	113	59	81%
Perseverative Errors	7	113	59	81%
% Perseverative Errors	8%	112	58	79%
Nonperseverative Errors	6	110	57	75%
% Nonperseverative Errors	7%	109	56	73%
Conceptual Level Responses	74			
% Conceptual Level Responses	81%	110	57	75%
Categories Completed	6			> 16%
Trials to Complete 1st Category	10			> 16%
Failure to Maintain Set	1			> 16%
Learning to Learn	-3.08			> 16%

Figure 10, WCST, Test Results

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SUMMARY

The Raven's 2 is a nonverbal assessment of general cognitive ability, including the ability to formulate new concepts when faced with novel information, extract meaning out of confusion or ambiguity, and think clearly about complex situations and events. Contemporary cognitive assessment theory suggests that solving progressive matrices involves cognitive functions such as perception and attention to visual detail, inductive reasoning, classification and spatial ability, simultaneous processing, fluid intelligence, broad visual intelligence, and working memory.

STANDARD SCORE PROFILE

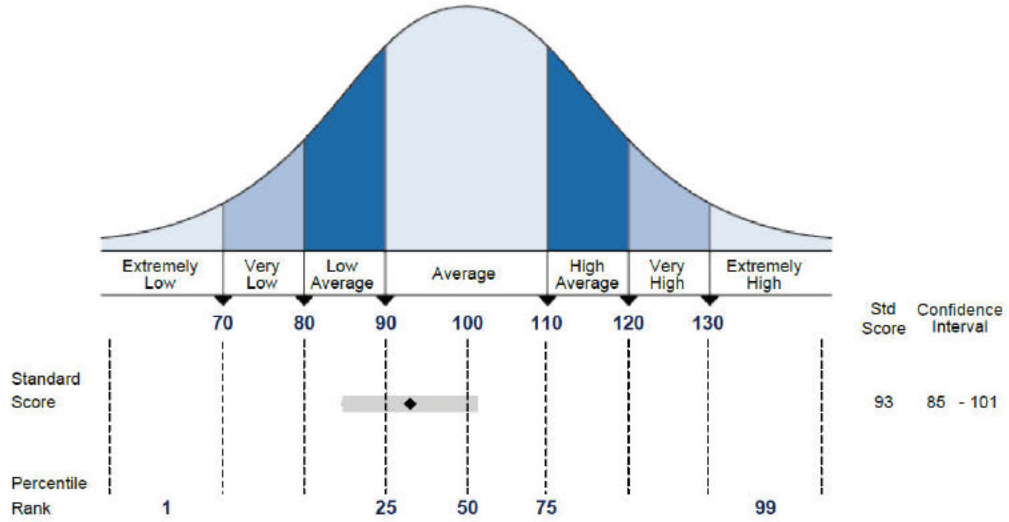

Figure 11a, Raven's 2, Standard Score Profile

SCORE SUMMARY

Total Raw Score*	-
Ability Score	512
Standard Score	93
Percentile Rank	32
90% Confidence Interval	85 - 101
NCE	40
Stanine	4
Descriptive Classification	Average
Age Equivalent (4:0-19:11)	12:3

*Digital form total raw scores are not directly comparable or interpretable because each individual is administered a unique item set.

Figure 11b, Raven's 2, Score Summary

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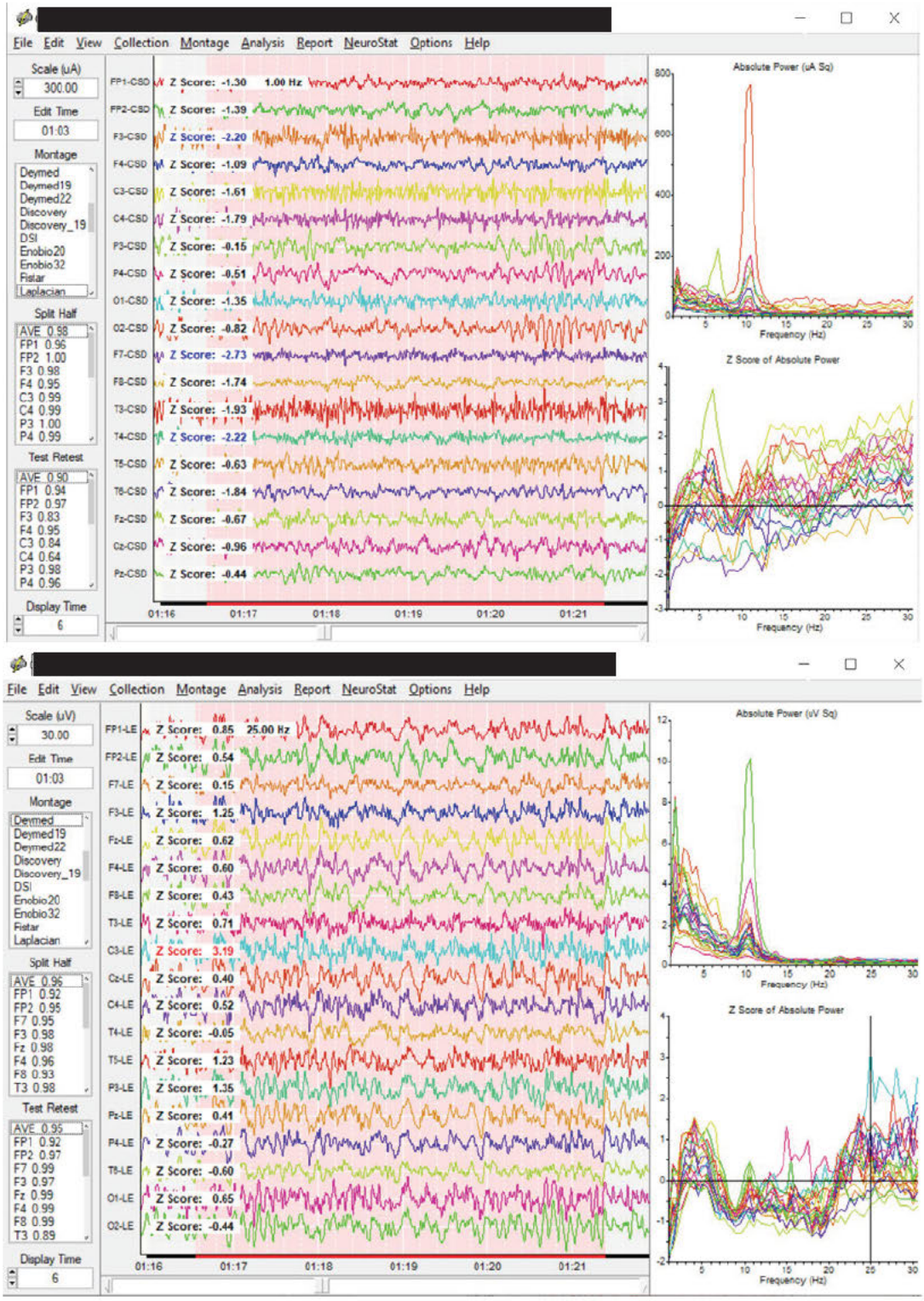

Figure 12a, Q1, FFT Frequency Distribution, eyes closed, Linked Ears and Laplacian Montage

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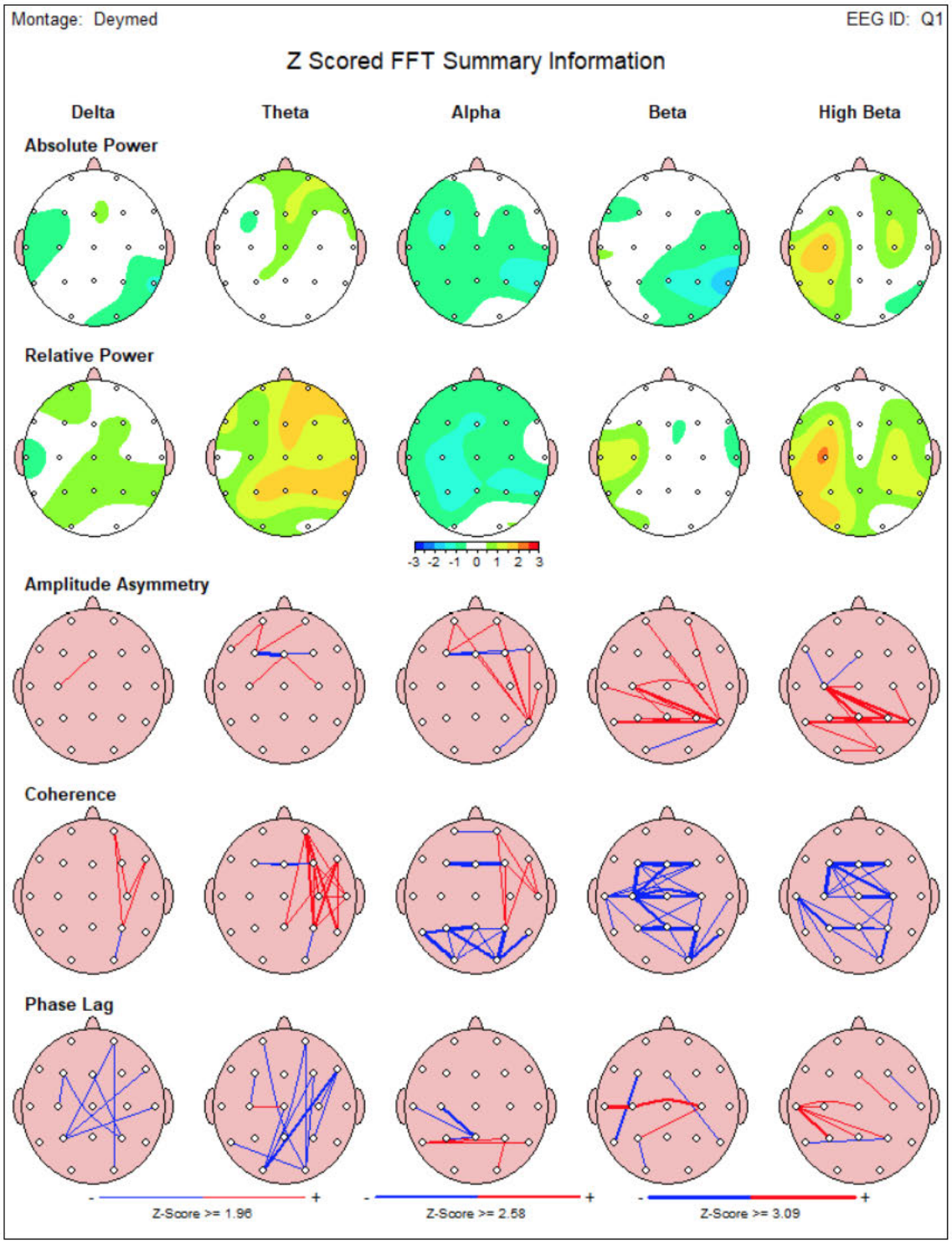

Figure 12b, Q1, Z-Scored FFT Summary Information, eyes-closed, Linked Ears

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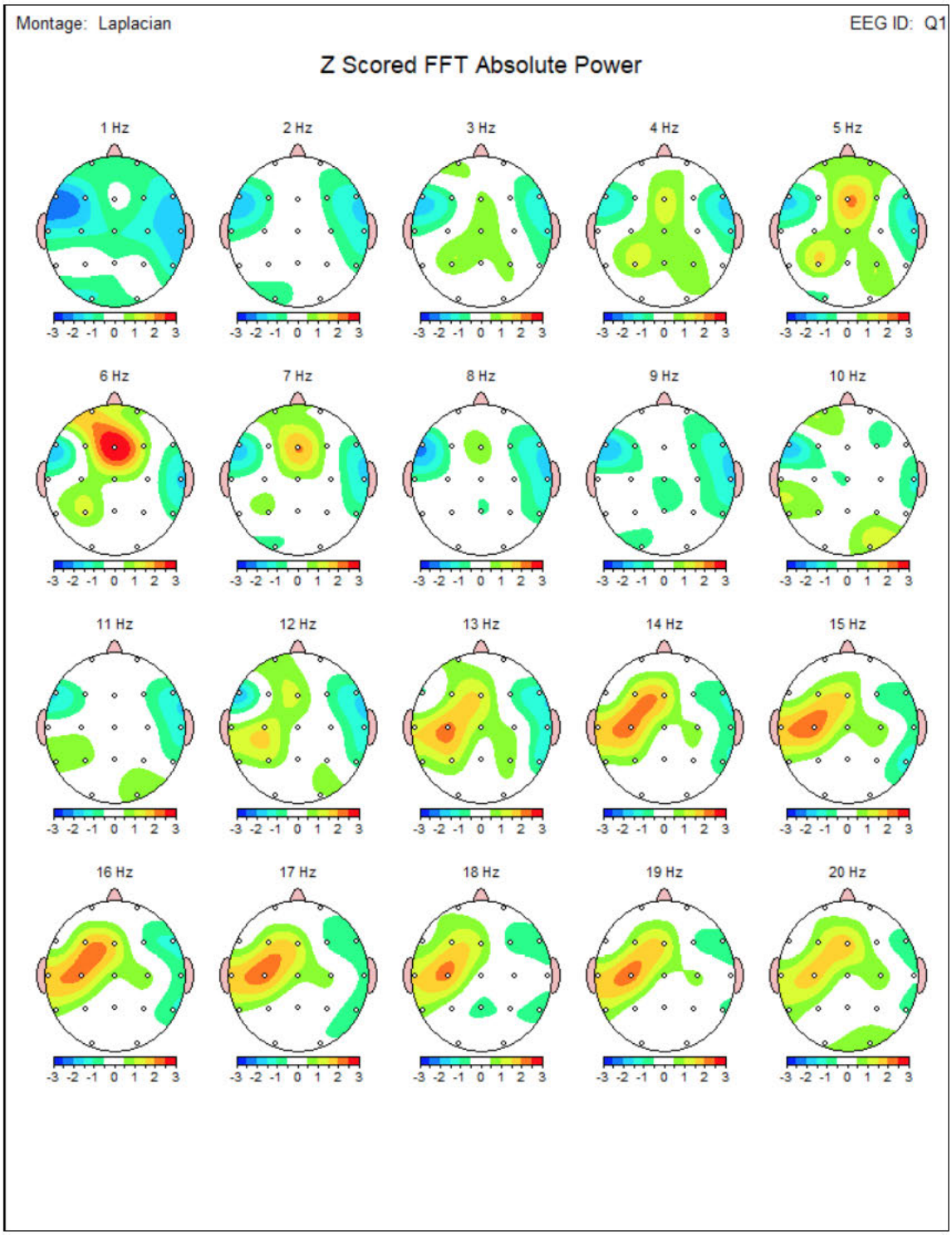

Figure 13a, Q1, FFT Absolute Power, eyes closed

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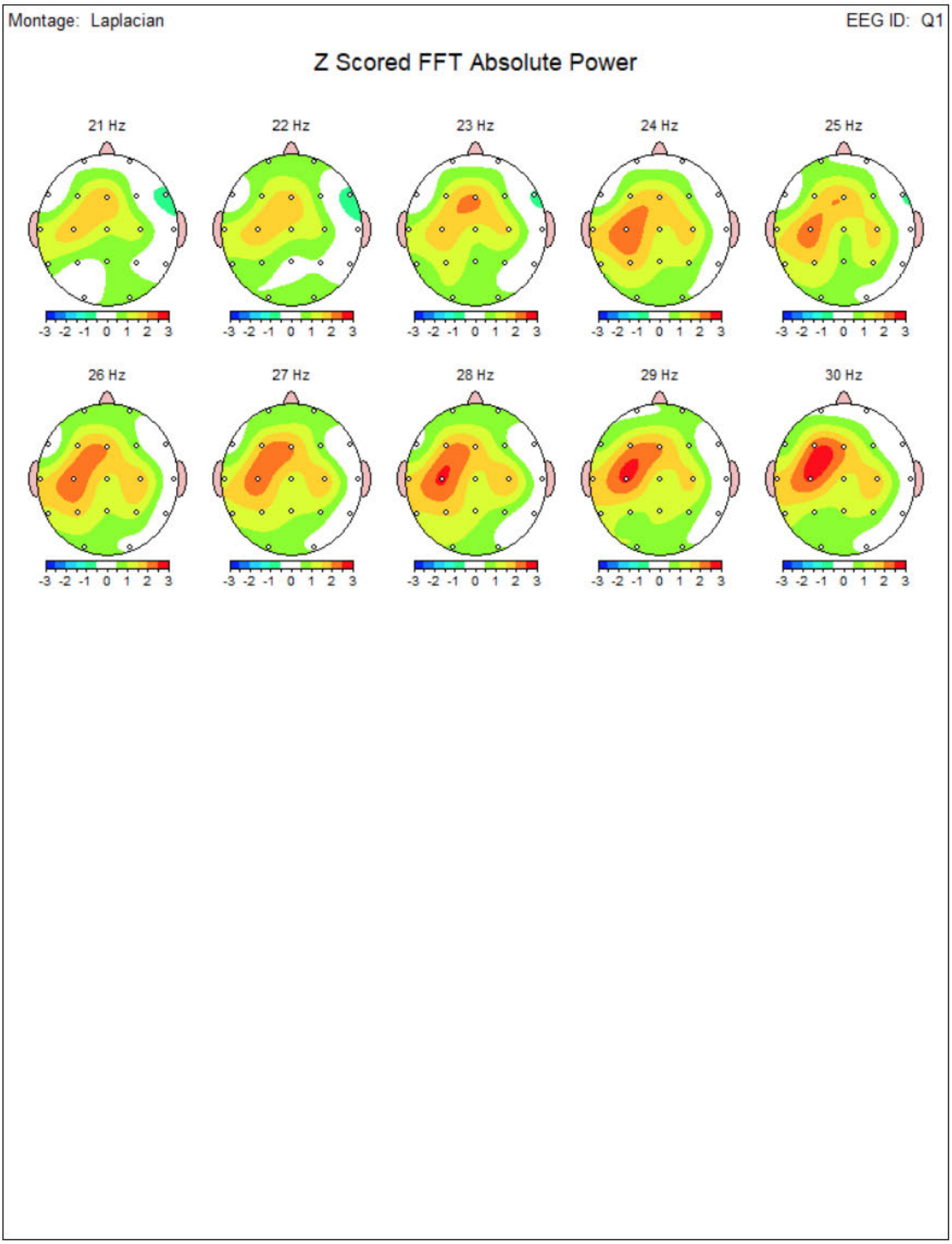

Figure 13b, Q1, FFT Absolute Power, eyes closed

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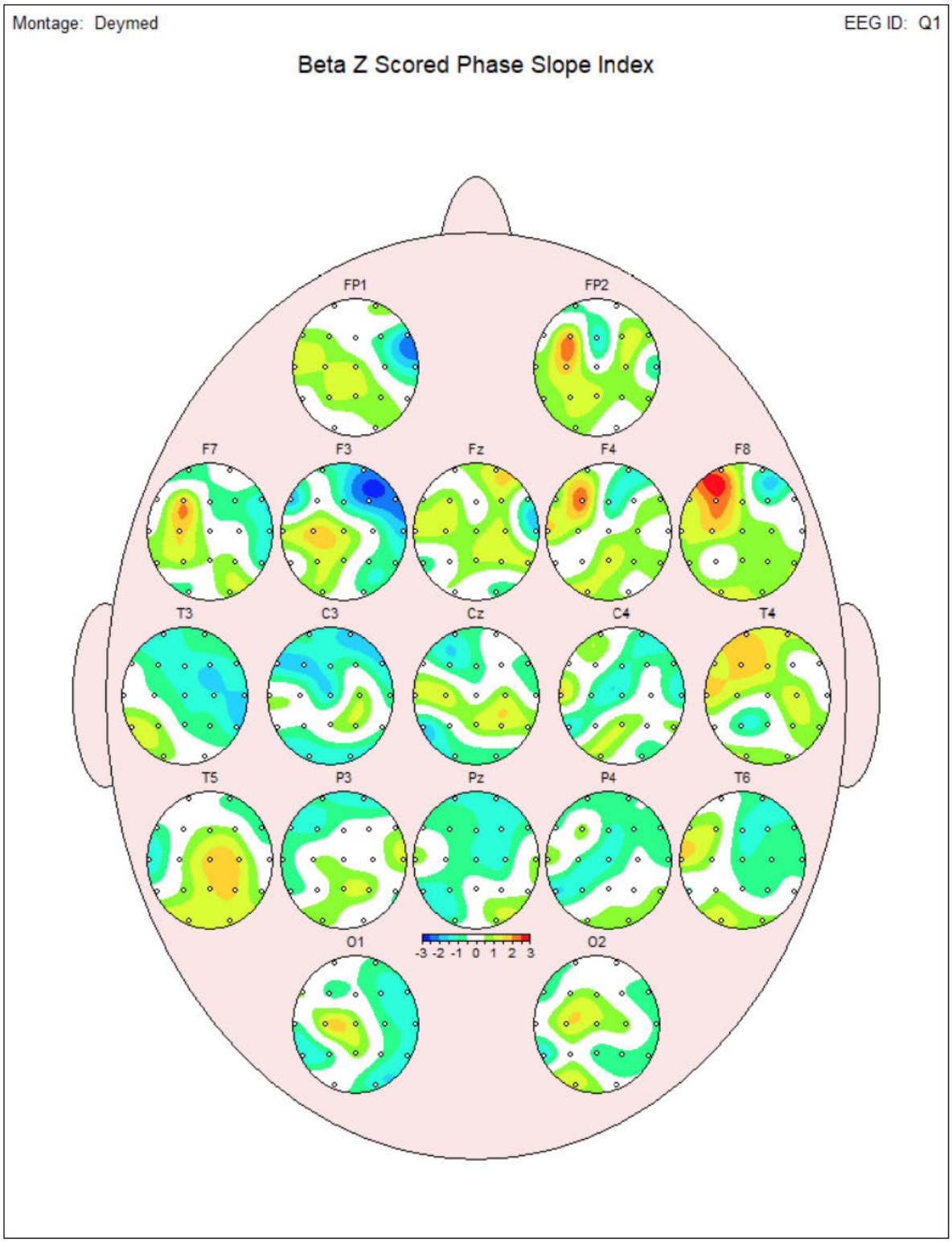

Figure 14a, Q1, Phase Slope Index, Beta, eyes closed

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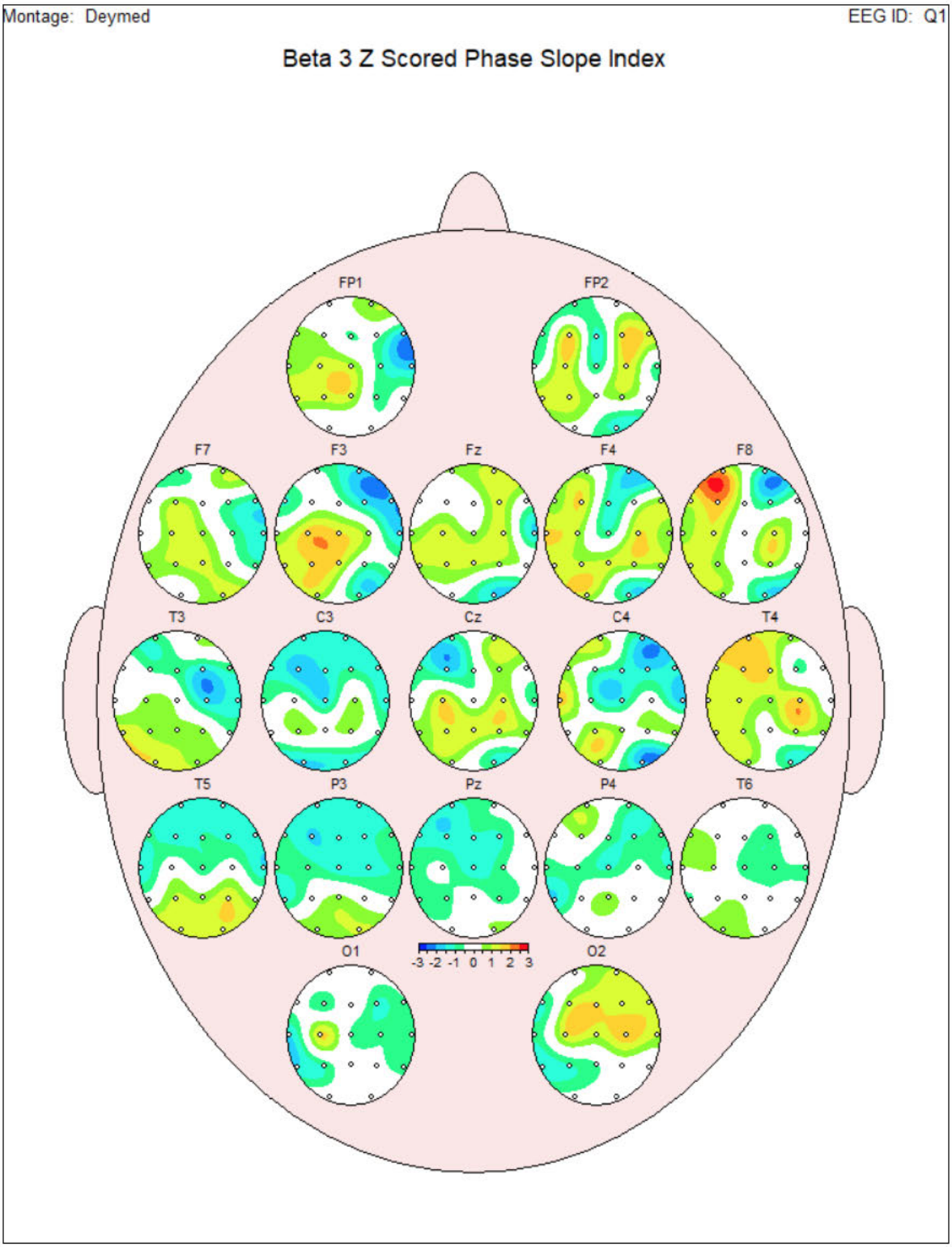

Figure 14b, Q1, Phase Slope Index, Beta 3, eyes closed

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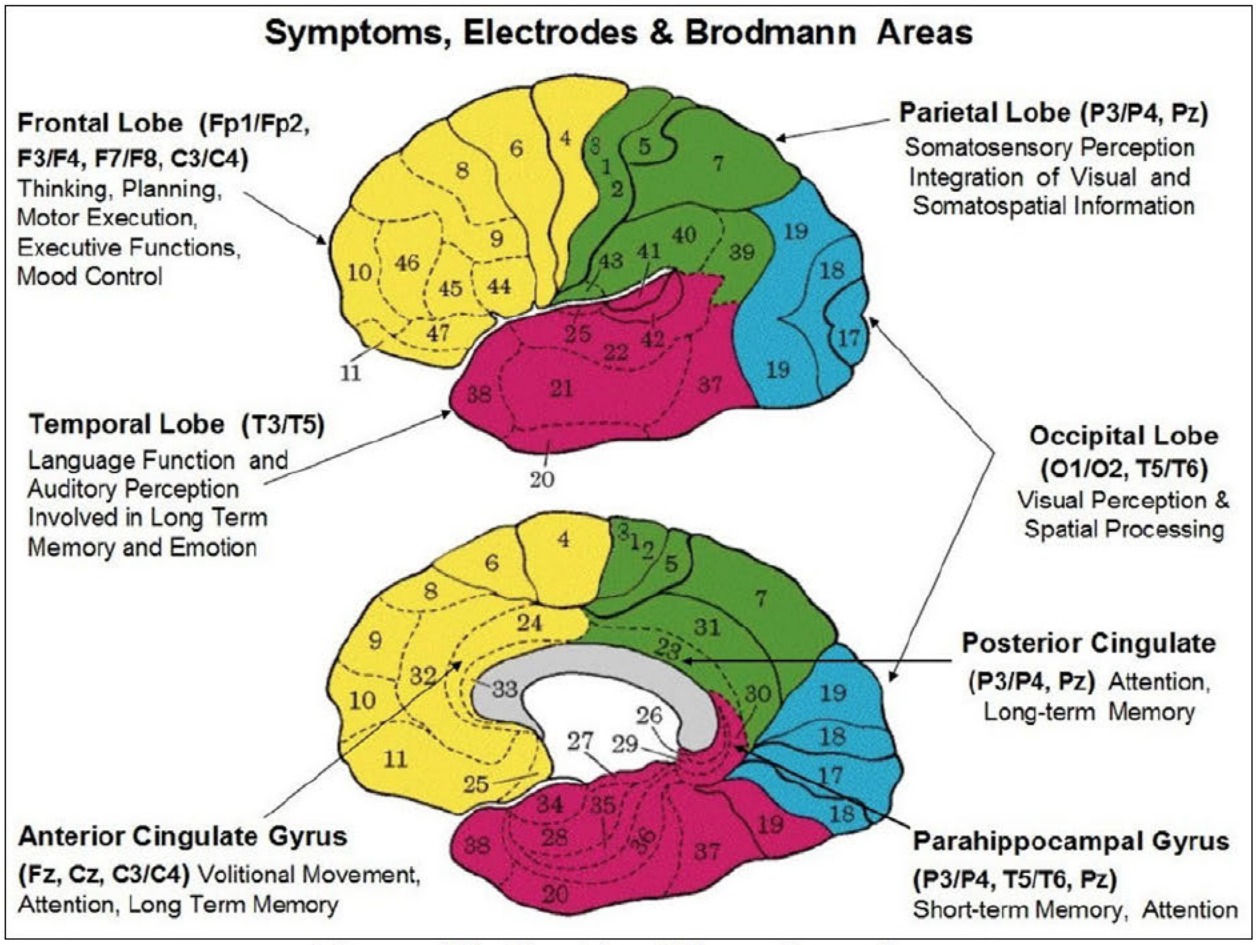

Figure 15, Electrical NeuroImaging

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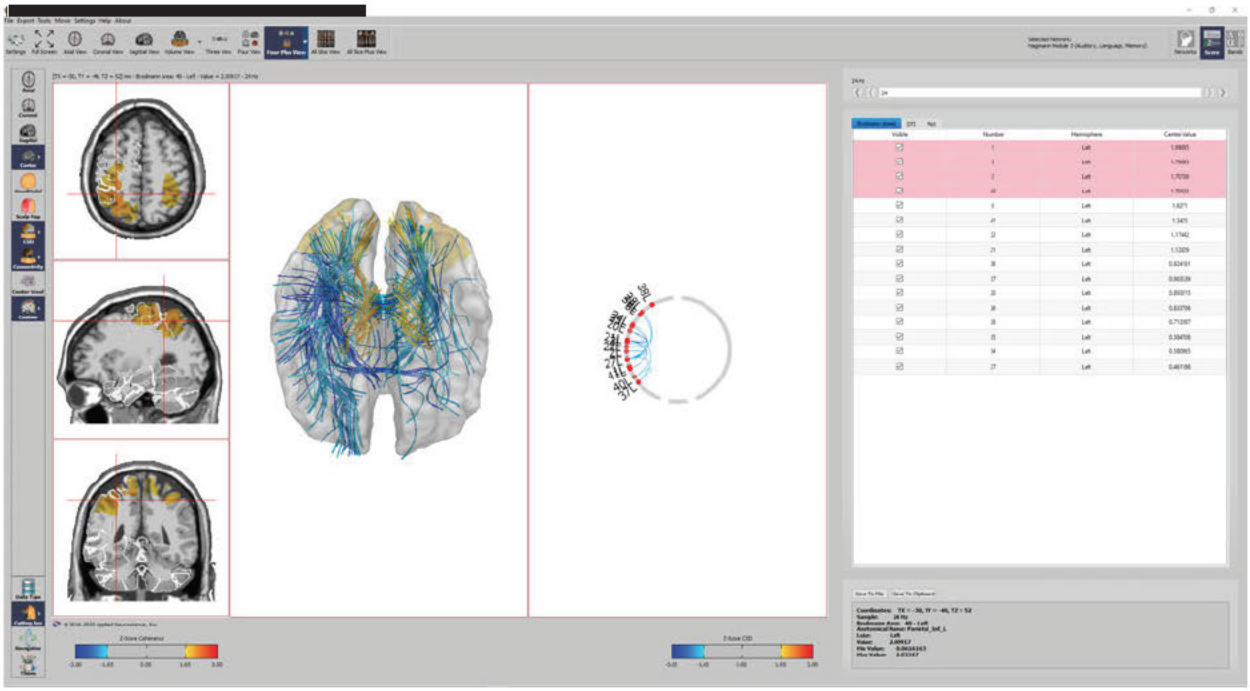

Figure 16a, swLORETA @ 24 Hz, eyes closed
Hagman 3 (Auditory, Language, & Memory) Network

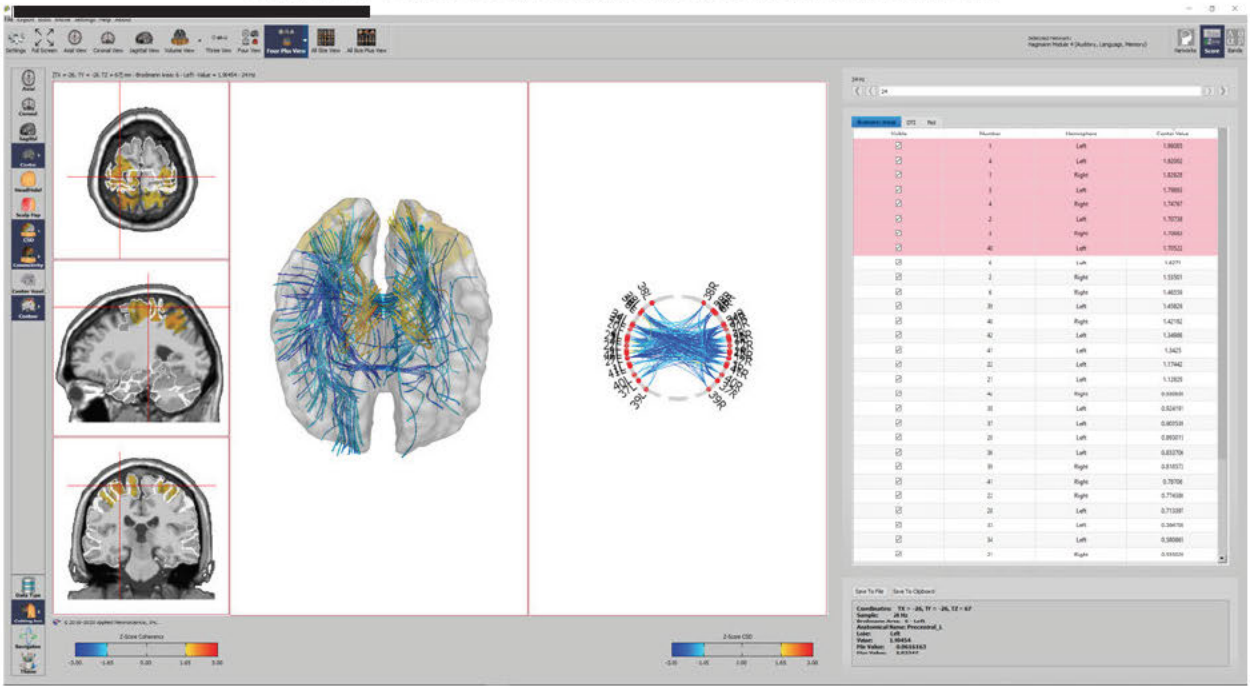

Figure 16b, swLORETA @ 24 Hz, eyes closed
Hagman 4 (Auditory, Language, & Memory) Network

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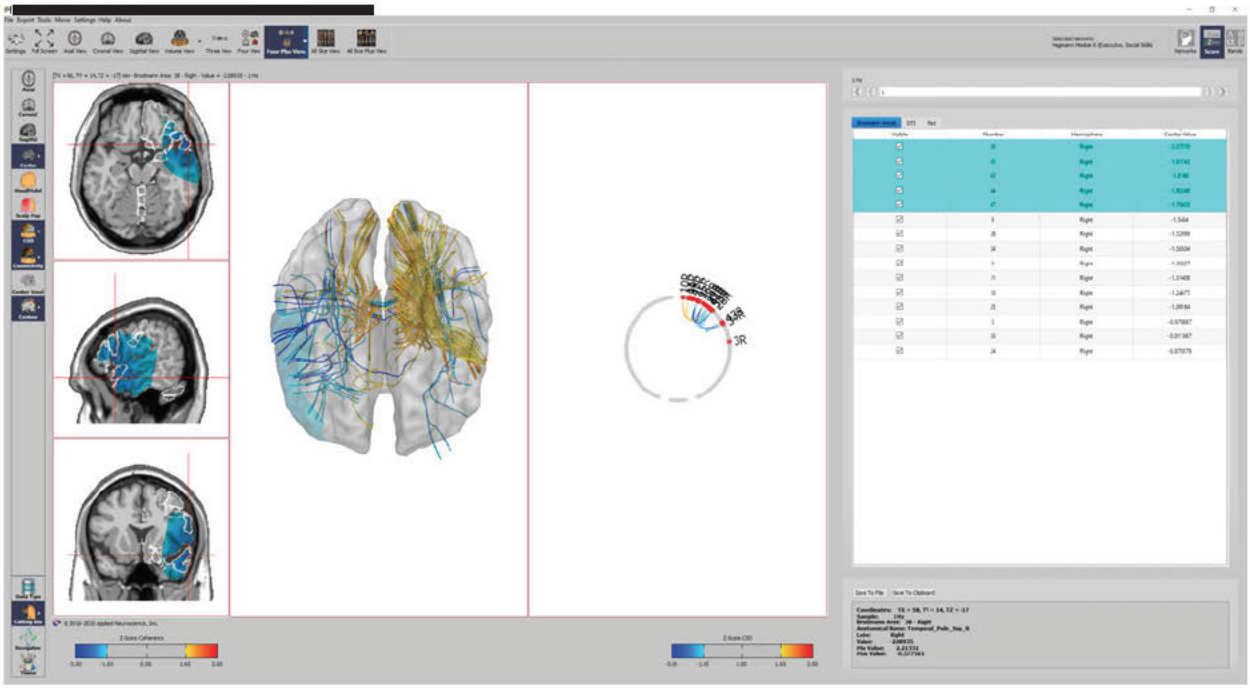

Figure 16c, swLORETA @ 01 Hz, eyes closed
Hagman 6 (Executive & Social Skills) Network

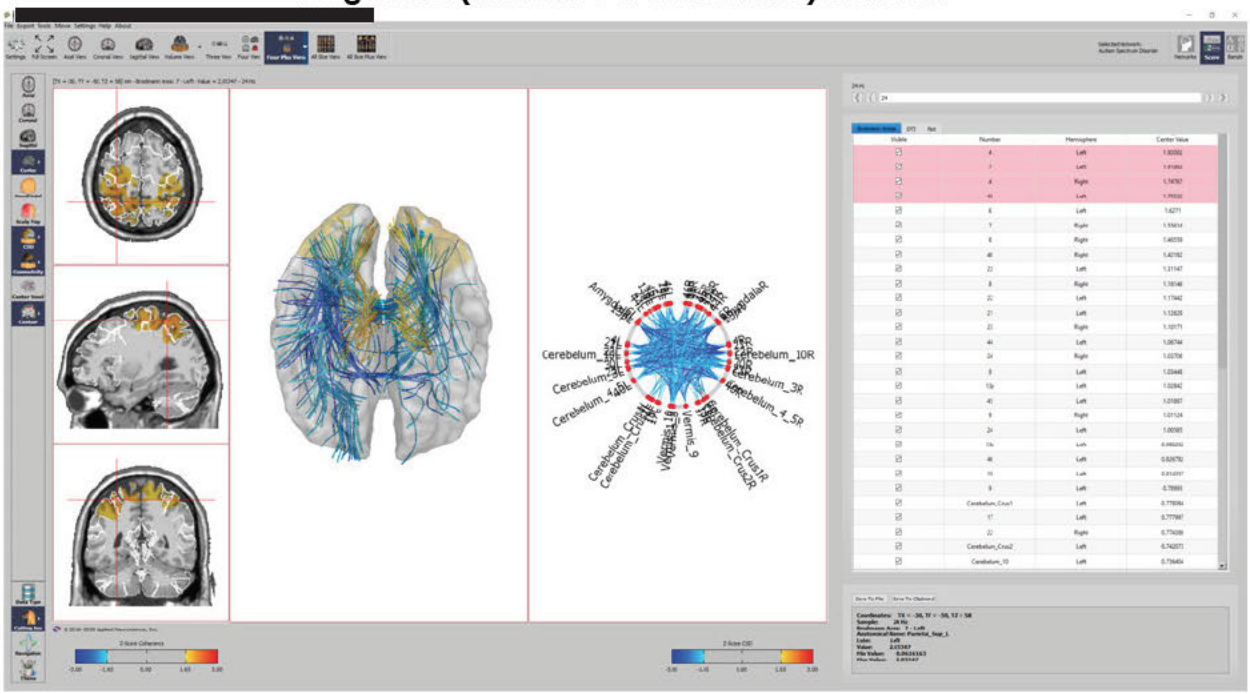

Figure 16d, swLORETA @ 24 Hz, eyes closed
Autism Spectrum Disorder Network

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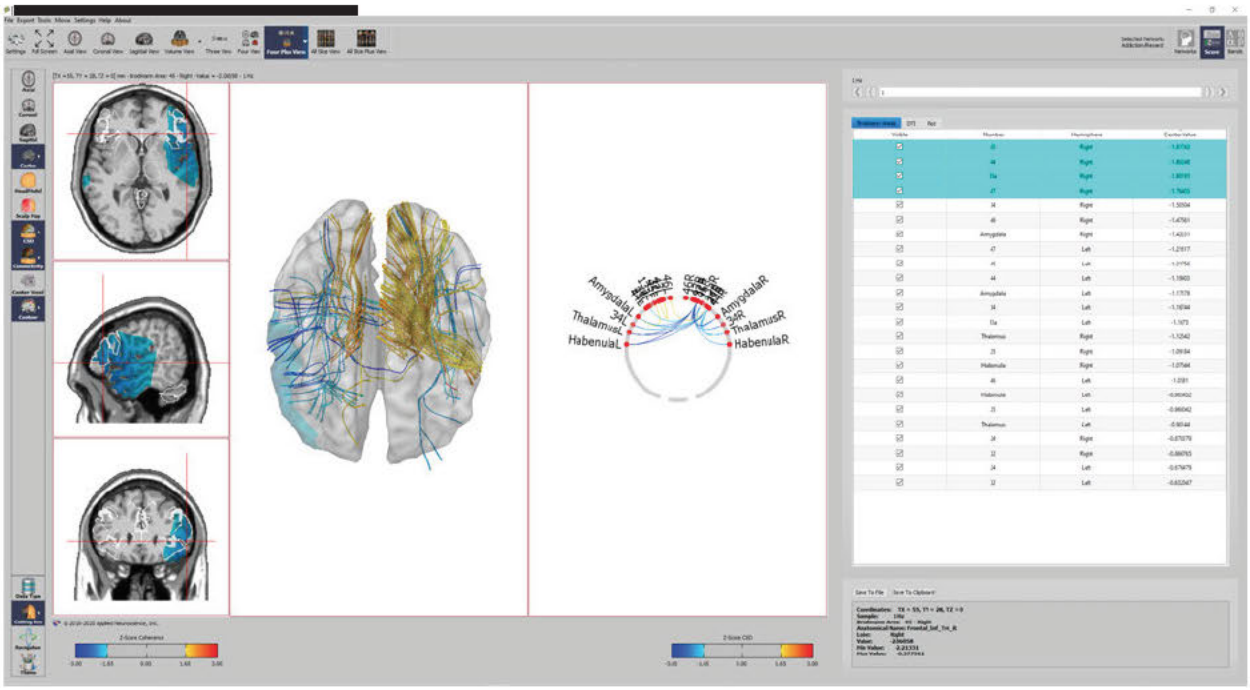

Figure 16e, swLORETA @ 01 Hz, eyes closed
Addiction/Reward Network

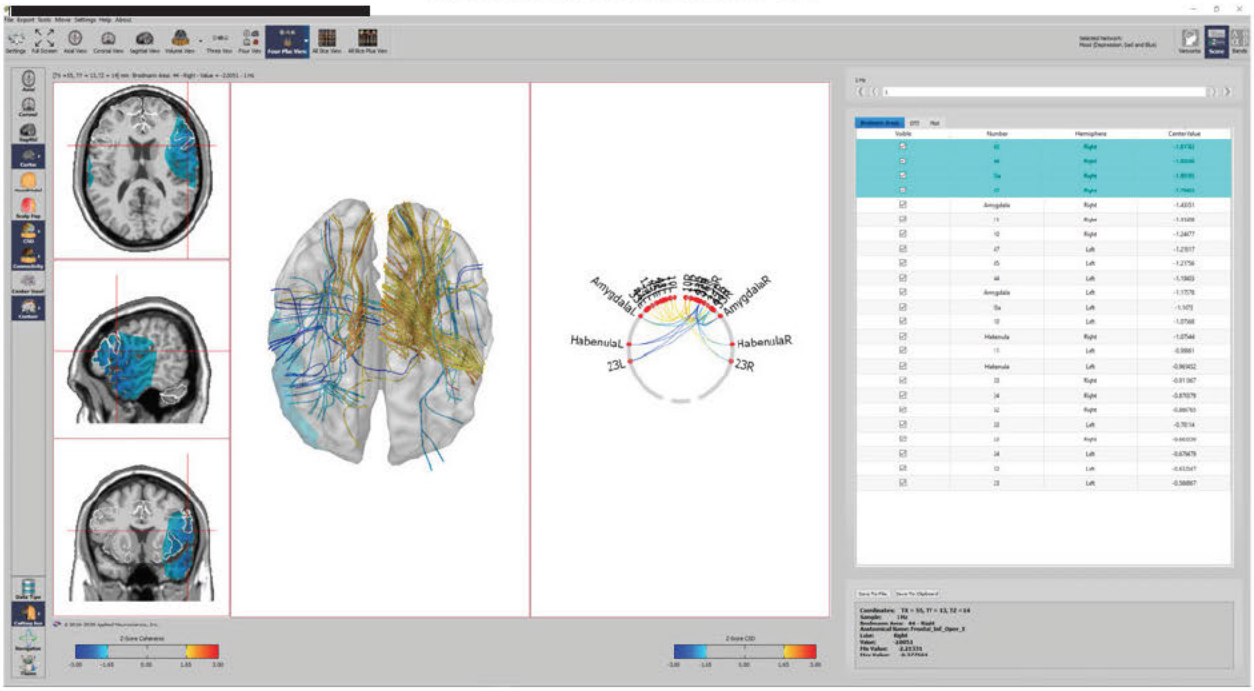

Figure 16f, swLORETA @ 01 Hz, eyes closed
Mood Network

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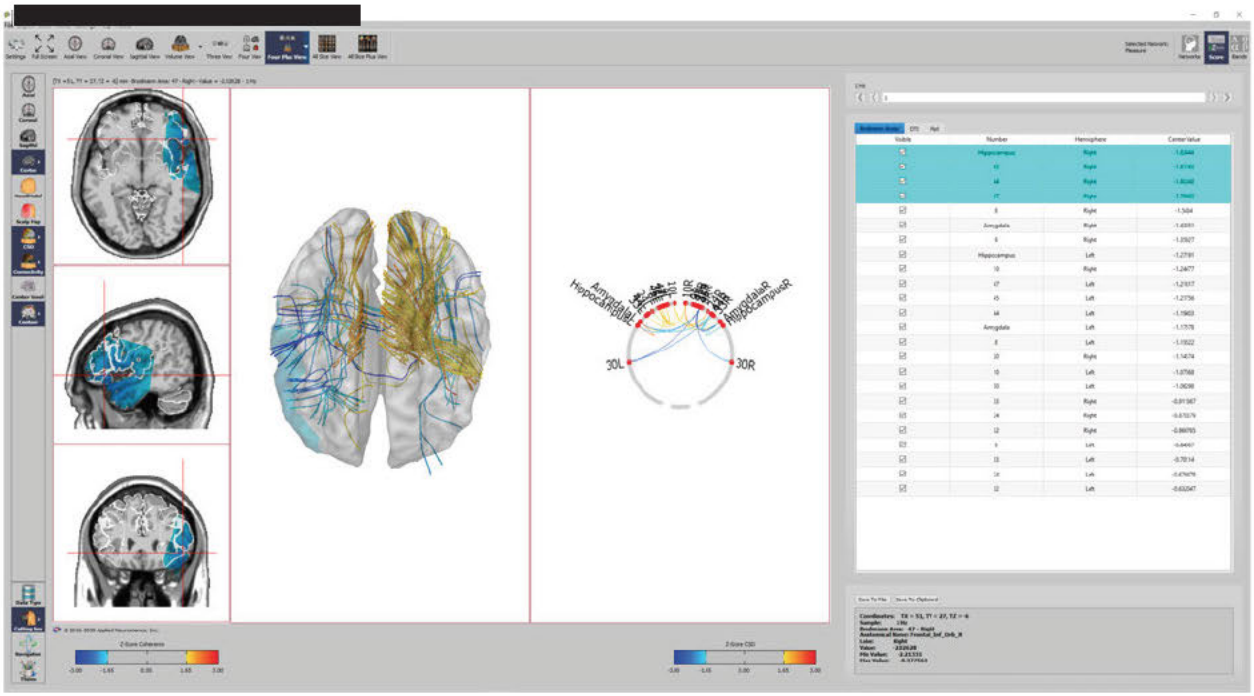

Figure 16g, swLORETA @ 01 Hz, eyes closed
Pleasure Network

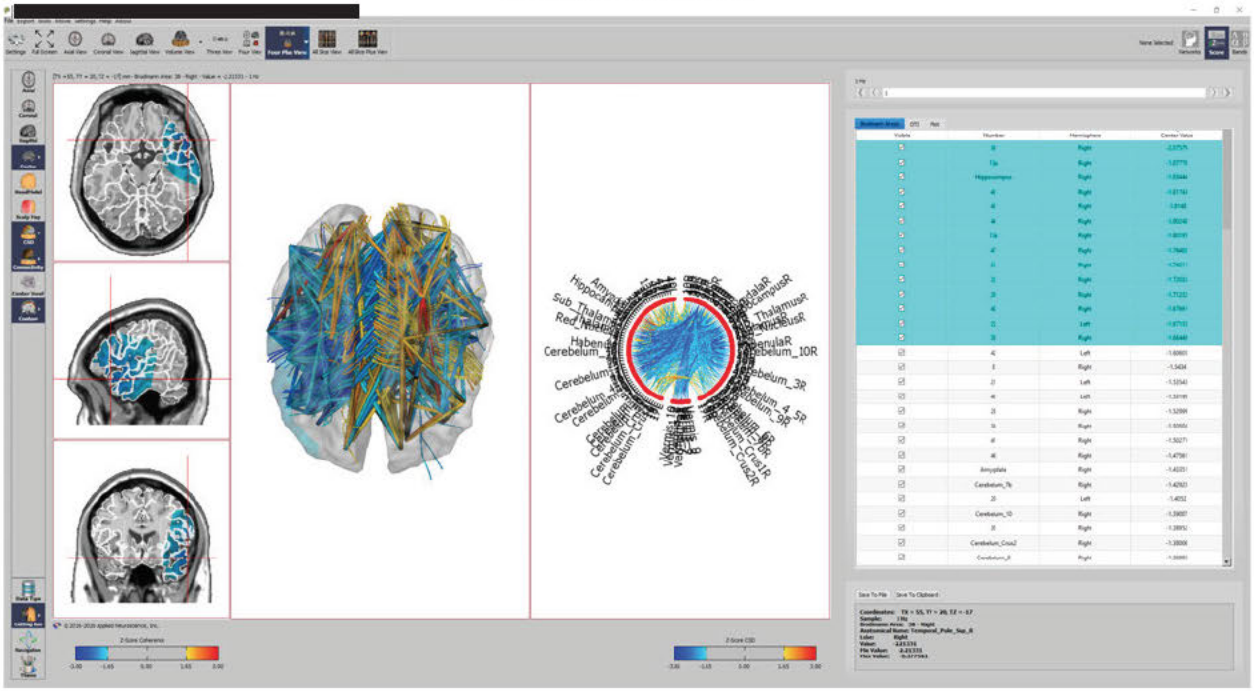

Figure 16h, swLORETA @ 01 Hz, eyes closed
Functional Connectivity-Superior Dorsal View

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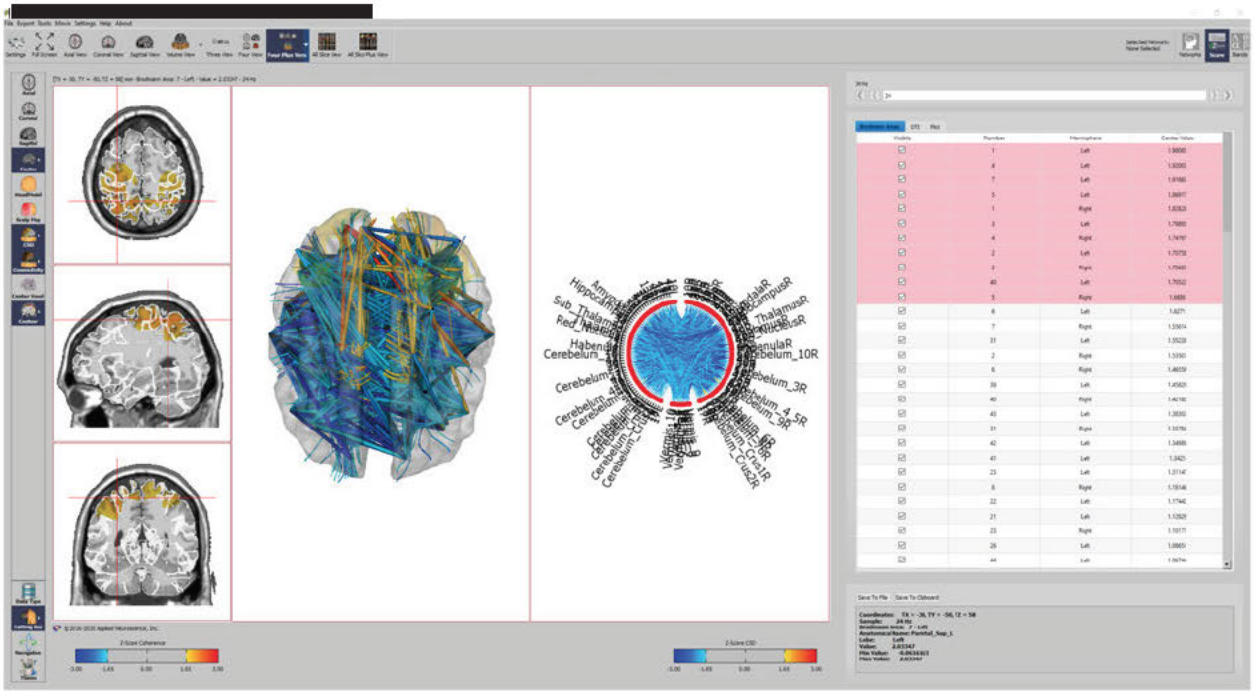

Figure 16i, swLORETA @ 24 Hz, eyes closed
Functional Connectivity-Superior Dorsal View

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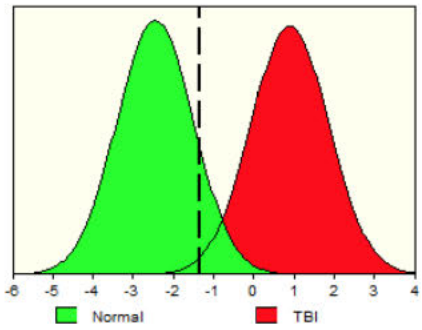
Montage: Deymed EEG ID: Q1

Traumatic Brain Injury Discriminant Analysis*

TBI DISCRIMINANT SCORE = -1.40 TBI PROBABILITY INDEX = Not Significant

The TBI Probability Index is the subject's probability of membership in the mild traumatic brain injury population. (see Thatcher et al, EEG and Clin. Neurophysiol., 73: 93-106, 1989.)



			RAW	Z
FP1-F3	COH	Theta	91.16	1.51
T3-T5	COH	Beta	24.73	-1.73
C3-P3	COH	Beta	72.25	0.27
FP2-F4	PHA	Beta	-0.22	-0.86
F3-F4	PHA	Beta	0.69	0.13
F4-T6	AMP	Alpha	37.73	1.92
F8-T6	AMP	Alpha	-4.36	2.59
F4-T6	AMP	Beta	59.91	1.61
F8-T6	AMP	Beta	19.69	1.98
F3-O1	AMP	Alpha	-111.21	-0.26
F4-O2	AMP	Alpha	-122.62	-0.43
F7-O1	AMP	Alpha	-137.95	-0.02
F4-O2	AMP	Beta	-48.76	-0.07
P3	RP	Alpha	27.55	-1.43
P4	RP	Alpha	31.34	-1.12
O1	RP	Alpha	45.81	-0.71
O2	RP	Alpha	62.16	0.29
T4	RP	Alpha	27.51	-0.57
T5	RP	Alpha	37.82	-0.68
T6	RP	Alpha	31.78	-1.18

***Statement of Indications of Use:**
The Discriminant Analysis and Severity Index are to be used by experienced and qualified professionals for the post-hoc statistical evaluation of the human electroencephalogram (EEG). The Discriminant Analysis and Severity Index are to be viewed as an adjunct to the evaluation of the patient, and they do not serve as a primary basis for a diagnosis. Warning: Inclusion criteria of a history of traumatic brain injury and greater than 13 years of age must be adhered to.

Figure 17, Q1, Traumatic Brain Injury Disc. Analysis

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Subject ID: [redacted]

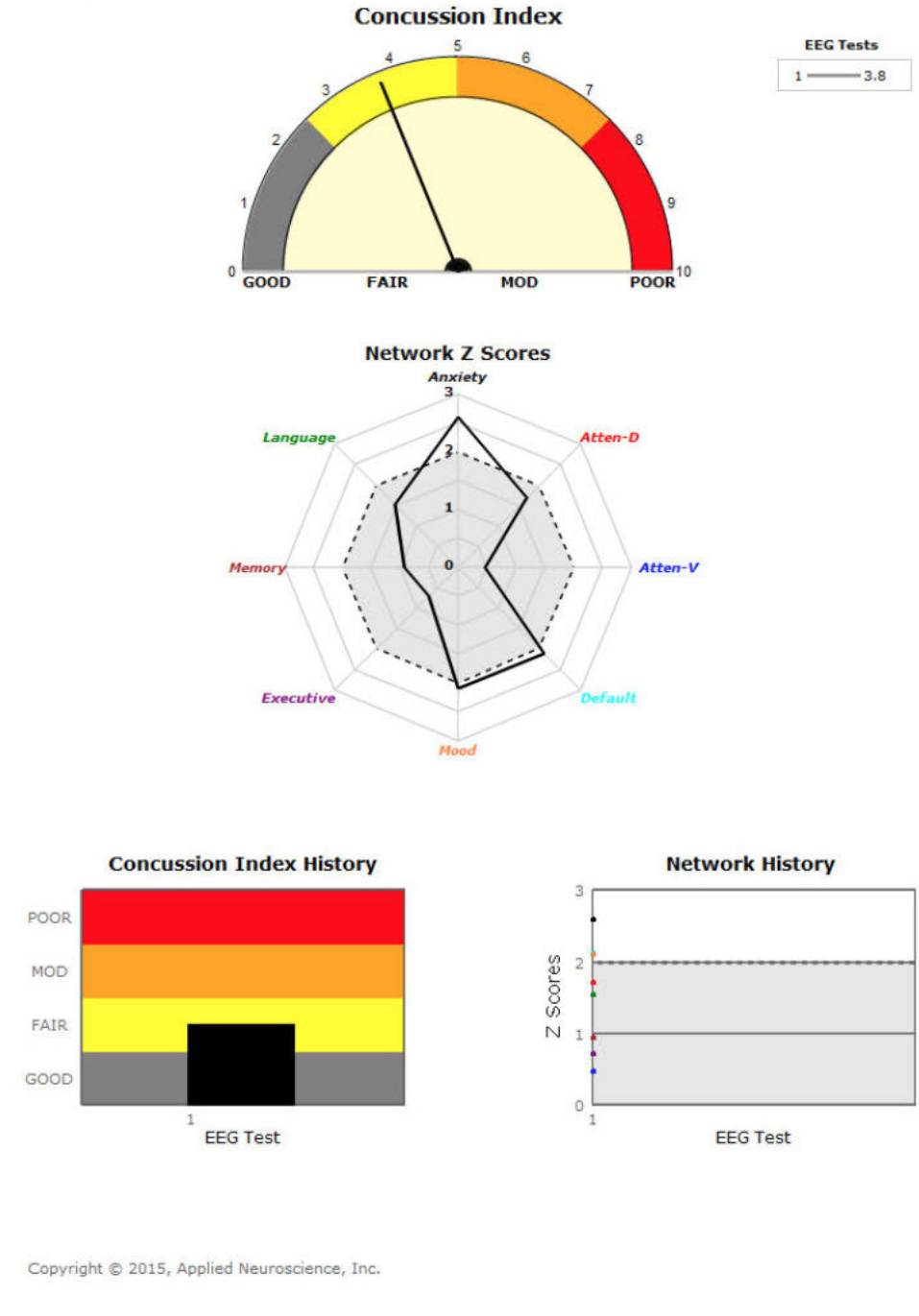

Figure 18, Q1, Concussion Index Analysis

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Appendix II

An Addendum to NeuroGuide QEEG Report

Important Disclaimer:

QEEG tests are ancillary tests that are not intended to provide a diagnosis by themselves but are used to evaluate the nature and severity of deregulation in the brain such as in mild traumatic brain injury (MTBI). The QEEG tests provide a quantitative assessment of areas of brain dysfunction and information on impaired conduction and connectivity between different regional neural networks in the brain. The assessment of impaired connectivity is based on abnormal measurements of Coherence and Phase. The TBI Discriminant and Concussion Index do not provide a diagnosis for MTBI but only information on the presence of a pattern in the EEG that is often found in Patients with a history of mild traumatic brain injury. The TBI Discriminant and Concussion Index also provide information about connectivity and excitability of brain regions. The TBI Discriminant and Concussion Index are to be used only on Patients with a clinical history and symptoms of a Traumatic Brain Injury and Post-Concussion syndrome. The diagnosis of MTBI is a clinical one and is not based on any one test. A diagnosis is performed by the clinician, who integrates the medical history, clinical symptoms, neurocognitive tests with the abovementioned brain function tests as well as other information to render a diagnosis. The information on impaired brain connectivity is derived primarily from abnormal measurements of Coherence and Phase. Assessments of regional abnormality rely also on abnormal amplitude (power) distribution across the spectrum of EEG frequencies as compared to the normative database.

Artifact Rejection:

NeuroGuide uses the standard deletion of artifact method to only select artifact free EEG data for analyses. The entire EEG record must be viewed by clicking end and page down and page up and home and by arrow keys and by moving the wiper at the bottom of the screen. A careful visual examination of the EEG record is necessary to detect epilepsy and gross pathology as well as to identify artifacts. The goal is to avoid selecting any artifact and instead to only select artifact free segments of EEG. There are three methods of obtaining Artifact Free Selections: 1- Manual Selections are obtained by pressing the left mouse button and dragging to select, press right mouse button and drag to erase; 2- Artifact Free Template Matching; and 3- Z Score Artifact Free Selections. All three methods can be used, and manual selection takes priority over all methods of artifact free selection. That is, left and right mouse button dragging will override all other methods. View the Length of EEG Selections in seconds and View the dynamic Reliability Measures of the EEG Selections. For Manual Selections of Artifact Free EEG Depress the left mouse button and drag it over the sections of EEG that do not contain eye movement or muscle or drowsiness or head movement or any other type of artifact. Select at least 60 seconds of artifact free EEG data as shown in the Edit Time counter (upper left of screen). If a mistake is made, then right mouse clicks and drag over the EEG traces to erase a selection. View the Test Re-Test

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reliability which must be at least 0.90. Scan the EEG record and select real and valid EEG and avoid selecting artifact. Splice discontinuities are removed by filtering and exercises to prove no distortion due to splicing are available in the Handbook of QEEG and EEG Biofeedback. Pattern recognition routines are used to identify likely eye movement (EOG), drowsiness and muscle (EMG) artifact in the record and thereby mark these suspected segments and disallow them to be included in subsequent analyses. The pattern recognition routines are based on physics and physiology of artifact. For example, all electrical sources decrement with distance and in the case of eye movement detection is by the presence of an electrical field gradient in the delta frequency band from Fp1/2 > F3/4 > C3/4 and/or 120 degrees or higher of inverse phase between F7 and F8. EMG electrical gradients at > 10 Hz from T3/4 > C3/4 and/or Fp1/2 > F3/4 > C3/4 and/or O1/2 > P3/4. Drowsiness occurs when the locus coeruleus reduces inhibition on the hypothalamic sleep centers resulting in 2 - 4 Hz action potential bursting that projects to the ventral posterior thalamic relay nuclei. Drowsiness pattern detection involves elevated slow waves in the EEG maximal in Cz and Fz as well as alpha slowing. NeuroGuide does not use any regression methods to allegedly remove artifact such as ICA/PCA or Blind Source or unpublished methods like SARA that distort Phase and Coherence and other aspects of the Power Spectrum. Details and tutorials demonstrating how the ICA and regression methods distort Phase and Coherence are available at: www.appliedneuroscience.com/Tutorial_Adulteration_Phase_Relations_when_using_ICA.pdf.

Split Half and Test Re-Test Reliability:

Split-Half (SH) reliability is the ratio of variance between the even and odd seconds of the time series of selected digital EEG (variance = sum of the square of the deviation of each time point from the mean of the time points). Examine the average reliability and the reliability of each channel as you increase the length of the sample and manually select different segments. Selection of artifact free EEG should have a reliability > 0.95 and a sample length of edited EEG > 60 seconds. Test Re-Test (TRT) reliability is the ratio of variance between the first half vs. the second half of the selected EEG segments (variance = sum of the square of the deviation of each time point from the mean of the time points). Test Re-Test reliability > 0.90 and a sample length of edited EEG > 60 seconds is commonly published in the scientific literature. Test Re-Test reliability is an excellent statistic to compare Brain state changes such as drowsiness as well as the consistency of a measure independent of changes in brain state.

Description of the NeuroGuide Normative Database:

The NeuroGuide normative database in versions 1.0 to 2.4.6 included a total of 678 carefully screened individual subjects ranging in age from 2 months to 82 years. NG 2.6.8 involved the addition of 49 adult subjects ranging in age from 18.3 years to 72.6 years resulting in a normative database of 727 subjects. The inclusion/exclusion criteria, demographics, neuropsychological tests, Gaussian distribution tests and cross- validation tests are described in several peer reviewed publications (Thatcher et al, 1983; 1987; 2003). Two-year means were computed using a sliding average with 6 months overlap of subjects. This produced a stable and higher age resolution normative database with a total of 21 different age groups. The 21 age groups and age ranges and

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number of subjects per age group is shown in the bar graph in Appendix F figure 2 in the NeuroGuide Manual (click Help > NeuroGuide Help).

The individuals used to create the normative database met specific clinical standards of no history of neurological disorders, no history of behavioral disorders, performed at grade level in school, etc. Most of the subjects in the normative database were given extensive neuropsychological tests. Details of the normative database are published at: Thatcher, R.W., Walker, R.A. and Giudice, S. Human cerebral hemispheres develop at different rates and ages. Science, 236: 1110-1113, 1987 and Thatcher R.W., Biver, C.L., North, D., Curtin, R. and Walker, R.W. Quantitative EEG Normative Databases: Validation and Clinical Correlation. Journal of Neurotherapy, 2003, 7(3-4): 87-121. You can download a description of the normative database by going to www.appliedneuroscience.com and clicking on the webpage Articles & Links > Articles > Article #5.

Is there a normative database for different montages including bipolar montages?

Yes. The raw digital data from the same group of normal subjects is analyzed using different montages such as Average Reference, Laplacian current source density, a common reference based on all 19 channels of the 10/20 system and standard clinical bipolar montages (e.g., longitudinal, circular, transverse). Users can create any montage that they wish and there will be a normative reference database comparison available for both eyes closed, and eyes open conditions.

Age range of the LORETA Current Density and Source Correlation Normative Databases

The LORETA current density and source correlation norms use the same subjects as are used for the surface EEG norms and the age range is 2 months to 82 years. The computational details of the LORETA current density norms are published at: Thatcher, R.W., North, D., Biver, C. EEG inverse solutions and parametric vs. non-parametric statistics of Low-Resolution Electromagnetic Tomography (LORETA). Clin. EEG and Neuroscience, 36(1): 1-9, 2005 and Thatcher, R.W., North, D., Biver, C. Evaluation and Validity of a LORETA normative EEG database. Clin. EEG and Neuroscience, 2005, 36(2): 116-122. Copies of these publications are available to download from www.appliedneuroscience.com by clicking Articles & Links > Articles > Numbers 11 and 12. The computational details of the LORETA source correlation norms are in the NeuroGuide Manual, click Help > NeuroGuide Help > Appendix-G.

Implementation of LORETA measurement in NeuroGuide

The Key Institute's LORETA equations and the LORETA viewer (Pacual-Marqui et al, 1994; Pascual- Marqui, 1999) can be launched by a single mouse click in the NeuroGuide window. NeuroGuide exports frequency domain and time domain edits of 19 channel x 256-point digital EEG in microvolts (or uv^2) in the Lexicor electrode order as the standard input to the Key Institute T-Matrix. Rows are 256 microvolt time points, and the columns are 19 channels at a sample rate of 128 thus producing 0.5 Hz resolution from 1 to 30 Hz. 1 Hz increments in the LORETA viewer are computed as the sum of adjacent 0.5 Hz bins and thus the 'Time Frame' control in the LORETA

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Viewer is frequency from 1 to 30 Hz. (see Pascual-Marqui RD, Michel CM, Lehmann D., 1994. Low resolution electromagnetic tomography: a new method for localizing electrical activity in the brain. International J. of Psychophysiology, 18:49-65. For computational details see Pascual-Marqui. R.D., 1999. Review of Methods for Solving the EEG Inverse Problem. International J. of Bioelectromagnetism, 1(1): 75-86. Pascual-Margui, R.D., 2004. The Key Institute's free software and documentation was downloaded from www.unizh.ch/keyinst/NewLORETA/Software/Software.htm.)

Amplifier Matching is Necessary

This stems from the fact that amplifiers have different frequency gain characteristics. The matching of amplifiers to the NeuroGuide database amplifier was done by injecting microvolt calibration signals of different amplitudes and frequencies into the input of the respective EEG machines and then computing correction curves to exactly match the amplifier characteristics of the norms and discriminant functions. The units of comparison are in microvolts and a match within 3% is generally achieved. The NeuroGuide research team double checked the amplifier match by computing FFT and digital spectral analyses on calibration signals used to acquire the norms with the calibration signals used to evaluate a given manufacturers amplifiers.

History of the Scientific Standards of QEEG Normative Databases

A review of the history of QEEG normative databases was published in Thatcher, R.W. and Lubar, J.F. History of the scientific standards of QEEG normative databases. In: Introduction to QEEG and Neurofeedback: Advanced Theory and Applications, T. Budzinsky, H. Budzinsky, J. Evans and A. Abarbanel (eds)., Academic Press, San Diego, CA, 2008. A copy of the publication can be downloaded at: www.appliedneuroscience.com/HistoryofQEEG%20Databases.pdf.

QEEG Normative Database Publications and Validations:

Bosch-Bayard J, Valdes-Sosa P, Virues-Alba T, Aubert-Vazquez E, John ER, Harmony T, Riera-Diaz J, Trujillo-Barreto N. (2001). 3D statistical parametric mapping of EEG source spectra by means of variable resolution electromagnetic tomography (VARETA). Clin Electroencephalogr., 32(2):47-61.

Coburn, K.L., Lauterback, E.C., Boutros, N.N., Black, K.J., Arciniegas, D.B. and Coffey, C.E. (2006). The value of quantitative electroencephalography in clinical psychiatry: A report by the committee on research of the American Neuropsychiatric Association. J. Neuropsychiat. and Clin. Neurosci. 18: 460-500.

Congedo M, John RE, De Ridder D, Prichep L. (2010). Group independent component analysis of resting state EEG in large normative samples. Int J Psychophysiol. 78(2):89-99.

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Congedo M, John RE, De Ridder D, Prichep L, Isenhart R. (2010). On the "dependence" of "independent" group EEG sources; an EEG study on two large databases. Brain Topogr., 23(2):134-138.

Hernandez-Gonzalez G, Bringas-Vega ML, Galán-Garcia L, Bosch-Bayard J, Lorenzo-Ceballos Y, Melie-Garcia L, Valdes-Urrutia L, Cobas-Ruiz M, Valdes-Sosa PA; Cuban Human Brain Mapping Project (CHBMP). (2011). Multimodal quantitative neuroimaging databases and methods: the Cuban Human Brain Mapping Project. Clin EEG Neurosci., 42(3):149-59.

Duffy, F., Hughes, J. R., Miranda, F., Bernad, P. & Cook, P. (1994). Status of quantitative EEG (QEEG) in clinical practice. Clinical. Electroencephalography, 25(4), VI - XXII.

Gasser, T., Verleger, R., Bacher, P., & Sroka, L. (1988a). Development of the EEG of school-age children and adolescents. I. Analysis of band power. Electroencephalography and Clinical Neurophysiology, 69(2), 91-99.

Gasser, T., Jennen-Steinmetz, C., Sroka, L., Verleger, R., & Mocks, J. (1988b). Development of the EEG of school- age children and adolescents. II: Topography. Electroencephalography and Clinical Neurophysiology, 69(2),100-109.

Gordon, E., Cooper, N., Rennie, C., Hermens, D. and Williams, L.M. (2005). Integrative neuroscience: The role of a standardized database. Clin. EEG and Neurosci., 36(2): 64-75.

Hagmann P, Cammoun L, Gigandet X, Meuli R, Honey CJ, et al. (2008) Mapping the structural core of human cerebral cortex. PLoS Biol 6(7): e159. doi:10.1371/ journal.pbio.0060159.

Hughes, J. R. & John, E. R. (1999). Conventional and quantitative electroencephalography in psychiatry. Neuropsychiatry, 11, 190-208.

John, E.R. (1977) Functional Neuroscience, Vol. II: Neurometrics: Quantitative Electrophysiological Analyses. E.R. John and R.W. Thatcher, Editors. L. Erlbaum Assoc., N.J.

John, E.R. Karmel, B., Corning, W. Easton, P., Brown, D., Ahn, H., John, M., Harmony, T., Prichep, L., Toro, A., Gerson, I., Bartlett, F., Thatcher, R., Kaye, H., Valdes, P., Schwartz, E. (1977). Neurometrics: Numerical taxonomy identifies different profiles of brain functions within groups of behaviorally similar people. Science, 196:1393 1410.

John, E. R., Prichep, L. S. & Easton, P. (1987). Normative data banks and neurometrics: Basic concepts, methods, and results of norm construction. In A. Remond (Ed.), Handbook of electroencephalography and clinical neurophysiology: Vol. III. Computer analysis of the EEG and other neurophysiological signals (pp. 449-495). Amsterdam: Elsevier.

John, E.R., Ahn, H., Prichep, L.S., Trepetin, M., Brown, D. and Kaye, H. (1980) Developmental equations for the electroencephalogram. Science, 210: 1255-1258.

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John, E. R., Prichep, L. S., Fridman, J. & Easton, P. (1988). Neurometrics: Computer assisted differential diagnosis of brain dysfunctions. Science, 293: 162-169.

John, E.R. (1990). Machinery of the Mind: Data, theory, and speculations about higher brain function. Birkhauser, Boston.

Galán, L., Biscay, R., and Valdés P., (1994). Multivariate statistical brain electromagnetic mapping. Brain Topgr., 7(1):17-28.

Koenig T, Prichep L, Lehmann D, Sosa PV, Braeker E, Kleinlogel H, Isenhart R, John ER. (2002). Millisecond by millisecond, year by year: normative EEG microstates and developmental stages. Neuroimage, 16(1):41-48.

Matousek, M. & Petersen, I. (1973a). Automatic evaluation of background activity by means of age-dependent EEG quotients. EEG & Clin. Neurophysiol., 35: 603-612.

Matousek, M. & Petersen, I. (1973b). Frequency analysis of the EEG background activity by means of age dependent EEG quotients. In Automation of clinical electroencephalography, Kellaway & I. Petersen (Eds.), (pp. 75-102). New York: Raven Press.

Prichep, L.S. (2005). Use of normative databases and statistical methods in demonstrating clinical utility of QEEG: Importance and cautions. Clin. EEG and Neurosci., 36(2): 82-87.

Thatcher, R.W., Walker, R.A., Biver, C., North, D., Curtin, R., (2003). Quantitative EEG Normative databases: Validation and Clinical Correlation, J. Neurotherapy, 7(3-4): 87-121.

Thatcher, R. W. (1998). EEG normative databases and EEG biofeedback. Journal of Neurotherapy, 2(4): 8-39.

Thatcher, R.W., North, D., and Biver, C. (2005a) EEG inverse solutions and parametric vs. non-parametric statistics of Low-Resolution Electromagnetic Tomography (LORETA). Clin. EEG and Neuroscience, 36(1):1-8.

Thatcher, R.W., North, D., and Biver, C. (2005b) Evaluation and Validity of a LORETA normative EEG database. Clin. EEG and Neuroscience, 36(2): 116-122.

Thatcher, R.W., McAlaster, R., Lester, M.L., Horst, R.L. and Cantor, D.S. (1983). Hemispheric EEG Asymmetries Related to Cognitive Functioning in Children. In: Cognitive Processing in the Right Hemisphere, A. Perecuman (Ed.), New York: Academic Press.

Thatcher, R.W. (1992). Cyclic cortical reorganization during early childhood. Brain and Cognition, 20: 24-50.

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Thatcher, R.W. and Lubar, J.F. History of the scientific standards of QEEG normative databases. (2008) In: Introduction to QEEG and Neurofeedback: Advanced Theory and Applications, T. Budzinsky, H. Budzinsky, J. Evans and A. Abarbanel (eds)., Academic Press, San Diego, CA.

Thatcher, R.W. (2010) Reliability and validity of quantitative electroencephalography (qEEG). J. of Neurotherapy, 14:122-152.

Thompson, M. and Thompson, L. (2015). *The Neurofeedback Book: An Introduction to Basic Concepts in Applied Psychophysiology.*(2nd Ed). Biofeedback Institute of Toronto: Canada.