



eVox[®] Comprehensive Report

Prepared for:

Demo0074P17S1
Lyons , Larry

Analysis performed by:

Evoke Neuroscience, Inc.

Based on test performed on:

07-08-2020 , 4:19 PM

References can be found in the eVox User Manual. Display of data is intended to provide limited clinical decision support. It is not intended to replace medical judgment, provide clinical recommendations, diagnoses, or treatment decisions. Results do not account for medication effects. Detection of spike and wave discharges in the cortical EEG and other paroxysmal activity was not performed; patients with suspected seizure activity should be referred to a neurologist.

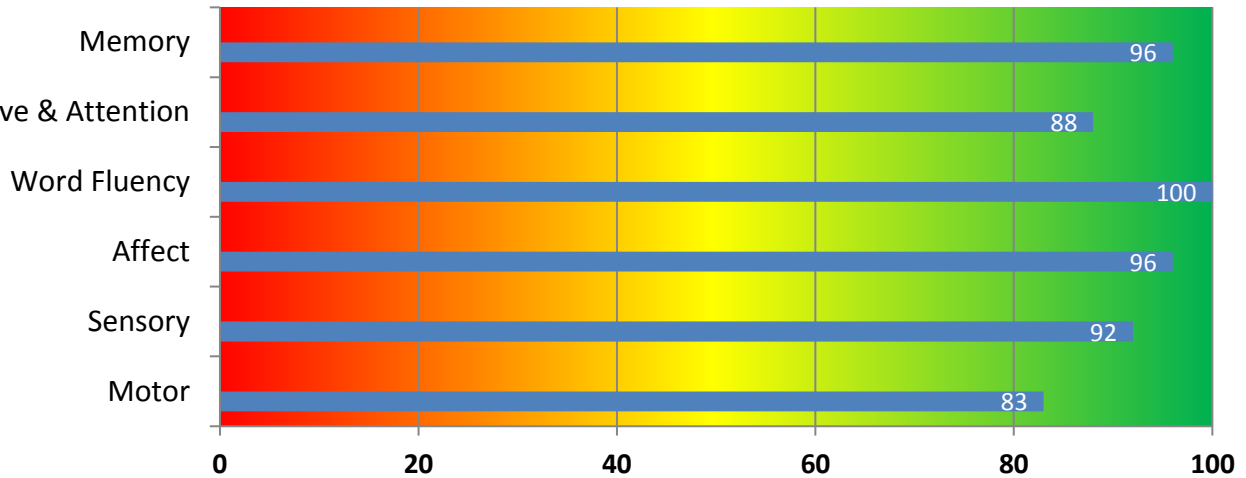
| | | | |
|-----------------------------------|------------------------|----------------------------------|---------------------------------|
| Patient: Lyons , Larry | | Date of Birth: 05-07-1958 | Date of Test: 07-08-2020 |
| Report Code: Demo0074P17S1 | Age: 62 yr 2 mo | Gender: Male | Handedness: Right |
| Symptoms: none | | | |
| Medications: none | | | |

Neuropsychological Screener

Score Range: 0 – 100%

Ref Range: >= 60 %

Screener Domain:



Global Score: 93 %

Memory Subtypes

Based on responses to Neuropsychological Screener in the Memory domain

| | |
|-----------------------------------|-------|
| Spatial Navigation | 100 % |
| Temporal Orientation | 100 % |
| Procedural Actions | 100 % |
| Episodic Memory for Places | 100 % |
| Face Recognition | 100 % |
| Semantic Word Knowledge | 75 % |

Response Metrics

| Metric | Result | Reference Range |
|---------------------------------|--------|-----------------|
| Response Speed | 447 ms | 200 - 500 ms |
| Response Consistency (variance) | 5 ms | <= 10 ms |
| Missed Response (omission) | 0.00 % | <= 10 % |
| Wrong Response (commission) | 7.35 % | <= 3 % |

Heart Metrics

| ECG Raw Data Quality Review | |
|---|-----------------|
| Data Type | Raw Data Sample |
| Cardiac Waveform (P-Q-R-S wave) Image taken from pre-artifacted ECG | |
| Heart Rate Variability | |

< 5 minutes of ECG data was analyzed. Comparisons to normative values may be unreliable.

| ECG Heart Metrics | | |
|-------------------|---------------|-----------------|
| Metric | Result | Reference Range |
| Heart rate | 96 bpm | 50 - 80 bpm |
| QRS duration | Indiscernible | 0.06 - 0.12 sec |

| Heart Rate Variability (HRV): Autonomic Nervous System Metrics | | | |
|--|-----------------------------------|---------------------------|-----------------------------------|
| Metric | Result | | Reference Range |
| SDNN | 14 ms | | 65 - 150 ms |
| Total power | 77 ms ² | | >= 800 ms ² |
| HRV Frequency Spectrum: Power (ms ²) | 60 | 11 | VLF < LF > HF |
| | Very Low Frequency sympathetic | Low Frequency balanced | High Frequency parasympathetic |

Event-Related Potentials (ERPs)

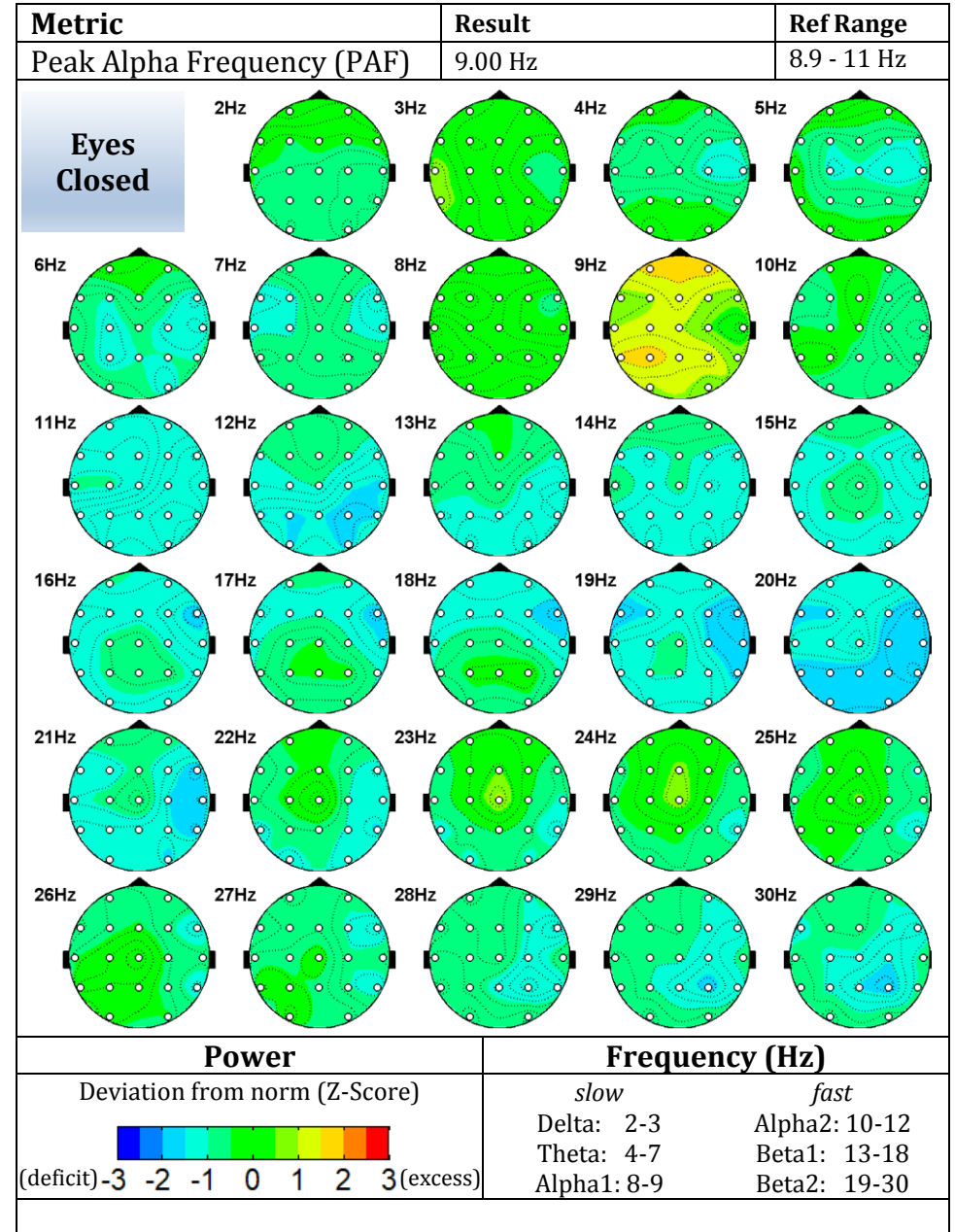
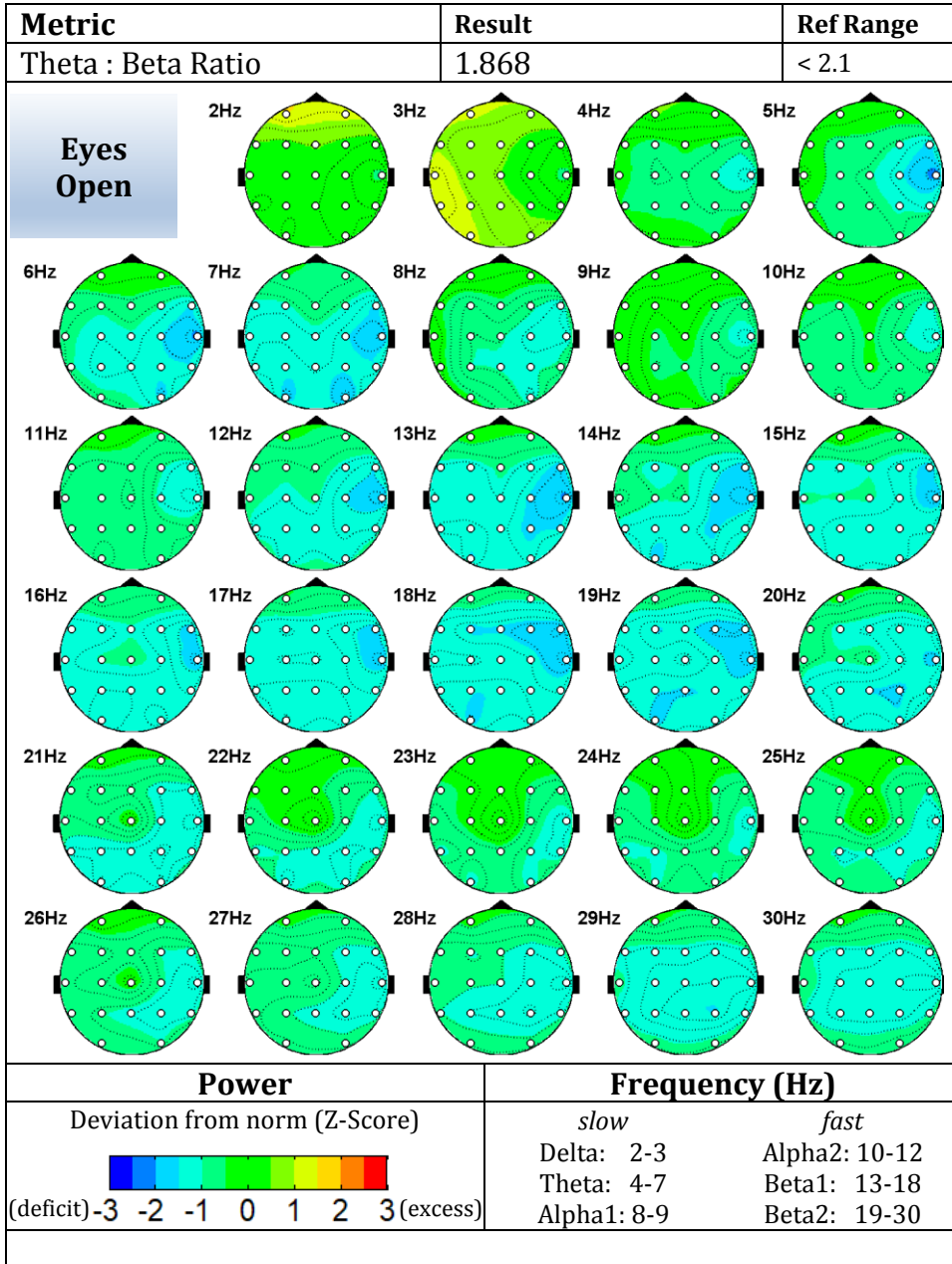
| ERP Component | Electrode Location/ Stimulus | Waveform | Result | Reference Range |
|-------------------------|----------------------------------|----------|----------------------|------------------------------|
| Attention (P300a) | CZ Checker-board Stimulus | | Speed: 532 ms | < 450 ms |
| | | | Power: 20.9 uV | >= 6 uV |
| Info processing (P300b) | PZ Target Stimulus | | Speed: 488 ms | < 450 ms |
| | | | Power: 13.2 uV | >= 6 uV and >50% P300a power |
| Visual (N100) | O1 Checker-board Stimulus | | Speed: 216 ms | < 250 ms |
| | | | Power: -19.3 uV | <= -6 uV |

Electroencephalogram (EEG): Raw Data

| EEG Raw Data Quality Review | |
|-----------------------------|-----------------|
| Condition | Raw Data Sample |
| Eyes open | |
| Eyes closed | |

EEG: Head Maps

Database comparison of frequency amplitude head maps.



EEG: Source Localization (LORETA)

low power

high power

L=left, R=right, P=parietal (back), A=anterior (front)

EYES OPEN

Region: **Medial Frontal Gyrus**

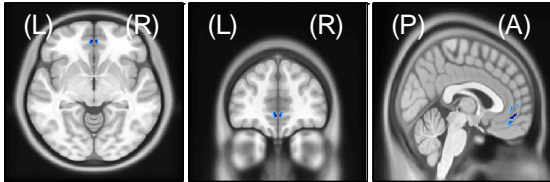
Primary BA: 10

Secondary BA: 32

Frequency: 5 Hz

Power (z-score): **-2.5 SD**

Function: verbal construction, emotional decision making^{190,191}; motor, memory recall, attention, executive function^{190,191}



Region: **Medial Frontal Gyrus**

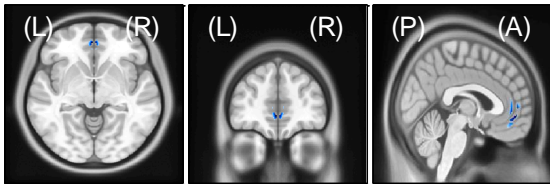
Primary BA: 10

Secondary BA: 11

Frequency: 6 Hz

Power (z-score): **-2.3 SD**

Function: verbal construction, emotional decision making^{190,191}; motor, memory recall, attention, executive function^{190,191}



Region: **Middle Temporal Gyrus**

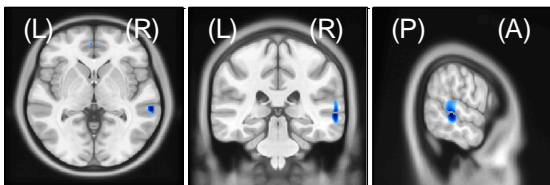
Primary BA: 21

Secondary BA: 22

Frequency: 13 Hz

Power (z-score): **-2.3 SD**

Function: prosodic information processing^{190,191}; auditory processing, categorization, rhythm, episodic memory, working memory, motor, face and object perception, balance^{190,191}



EYES CLOSED

Region: **Medial Frontal Gyrus**

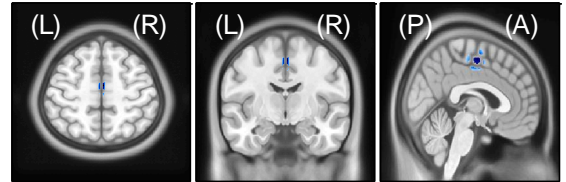
Primary BA: 6

Secondary BA: 31

Frequency: 19 Hz

Power (z-score): **-2.2 SD**

Function: visuo-spatial perception and attention, planning, mirror neurons, emotion processing, self-reflection, language, memory, motor, pain, touch, face and object recognition, auditory,^{190,191}



Region: **Medial Frontal Gyrus**

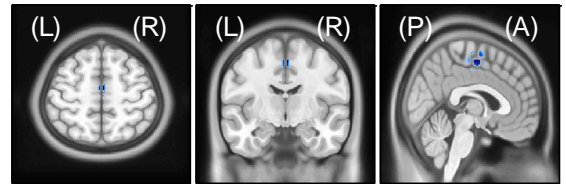
Primary BA: 6

Secondary BA: 31

Frequency: 20 Hz

Power (z-score): **-2.1 SD**

Function: visuo-spatial perception and attention, planning, mirror neurons, emotion processing, self-reflection, language, memory, motor, pain, touch, face and object recognition, auditory,^{190,191}



Region: **Inferior Parietal Lobule**

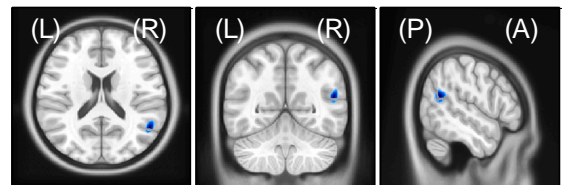
Primary BA: 40

Secondary BA: 39

Frequency: 18 Hz

Power (z-score): **-2.1 SD**

Function: emotions, self-reflections in decision making, attention (sustained and focused)^{190,191}; working/episodic memory, visuo-motor attention, auditory, gesture imitation, language, motor, pain, object and face perception, touch, balance^{190,191}



Deviations less than 2 ±SD are considered normal; deviations greater than 6 ±SD are assumed to be due to excessive artifact.

Data Summary Tables

Correlated function references can be located in the Clinician's Manual found on neuroread.net

NEUROPSYCHOLOGICAL SCREENER

| Metric | Result | | Reference Range | Correlated Function |
|-----------------------|--------|--|-----------------|---------------------|
| Memory | 96 % | | >= 60 % | |
| Executive & Attention | 88 % | | >= 60 % | |
| Word fluency | 100 % | | >= 60 % | |
| Affect | 96 % | | >= 60 % | |
| Sensory | 92 % | | >= 60 % | |
| Motor | 83 % | | >= 60 % | |

RESPONSE METRICS

| Metric | Result | | Reference Range | Correlated Function |
|------------------------------------|--------|---|-----------------|--|
| Response speed (reaction time) | 447 ms | | 200 - 500 ms | |
| Response consistency (variance) | 5 ms | | <= 10 ms | |
| Missed response (omission) | 0.00 % | | <= 10 % | |
| Wrong response (commission) | 7.35 % | H | <= 3 % | impulsivity ¹⁴⁸ ; hindered visual discrimination ¹³⁰ ; concussion/brain injury ¹¹⁸ ; questionable comprehension of task |

HEART METRICS

| Metric | Result | | Reference Range | Correlated Function |
|-----------------------|-----------------------------|---|------------------------|--|
| Heart rate | 96 bpm | H | 50 - 80 bpm | poor cardiac health/poor general fitness ^{2,58,60,61,65} ; anxiety ^{54,50} ; stress ^{34,44,45,47,49} ; concussion/brain injury ^{47,44,45,49,34} ; overtraining syndrome ⁵² |
| QRS duration | Indiscernible | | 0.06 - 0.12 sec | |
| SDNN | 14 ms | L | 65 - 150 ms | poor cardiac health ^{72,78} ; anxiety ⁷⁷ ; stress ^{51,54} ; cognitive impairment ⁶ ; concussion/brain injury ^{34,44,45,47,49} ; hypertension ^{63,77} ; hyperglycemia ⁸⁹ |
| Total power | 77 ms ² | L | >= 800 ms ² | poor cardiac health ⁵² ; sympathetic overactivation ⁵² ; stress ^{64,54} ; overtraining syndrome ⁵² ; affective and mood disorder ⁵³ ; cognitive impairment ^{1,5,6} |
| VLF:LF:HF power ratio | 60 : 11 : 6 ms ² | H | VLF < LF > HF | sympathetic over arousal ⁶⁵ |

EVENT-RELATED POTENTIALS (ERPs)

| Metric | Result | | Reference Range | Correlated Function |
|-------------------------|--------|---|-----------------|--|
| Attention (P300a) | 532 ms | H | < 450 ms | inattention ^{99,103} ; focus ⁹⁹ ; dopaminergic deficiencies ¹⁰⁵ ; frontal lobe dysfunction ^{105,112} ; memory problems ^{105,104} ; cognitive decline due to aging ^{100,103,101} |
| Info processing (P300b) | 488 ms | H | < 450 ms | working memory deficiency ^{104,108} ; information processing ^{110,113,114} ; temporal lobe dysfunction ^{104,105} ; parietal lobe dysfunction ^{105,112} ; inattention ^{103,106,107} ; focus ^{106,107} ; cognitive decline due to aging ^{100,103,114} |
| Visual | 216 ms | | < 250 ms | |

EYES OPEN ELECTROENCEPHALOGRAM (EEG)

| Metric | Result | | Reference Range | Correlated Function |
|---|---------|---|-----------------|--|
| Theta : Beta Ratio | 1.868 | | < 2.1 | Monastra norms are not available for this age range (older than 31). |
| Peak Alpha Frequency (PAF) | 9.70 Hz | | 8.9 - 11 Hz | |
| Brodmann Area 10 (left) Medial Frontal Gyrus | 5 Hz | L | $\geq 2 \pm SD$ | verbal construction, emotional decision making ^{190,191} ; motor, memory recall, attention, executive function ^{190,191} |
| Brodmann Area 10 (left) Medial Frontal Gyrus | 6 Hz | L | $\geq 2 \pm SD$ | verbal construction, emotional decision making ^{190,191} ; motor, memory recall, attention, executive function ^{190,191} |
| Brodmann Area 21 (right) Middle Temporal Gyrus | 13 Hz | L | $\geq 2 \pm SD$ | prosodic information processing ^{190,191} ; auditory processing, categorization, rhythm, episodic memory, working memory, motor, face and object perception, balance ^{190,191} |

- Other EEG findings are noted. Refer to Digital EEG Analysis-Head maps.
- No deviations between $2 \pm SD$ and $6 \pm SD$. Measurements less than $2 \pm SD$ are considered normal. Measurements greater than $6 \pm SD$ are assumed to be due to excessive artifact.

EYES CLOSED ELECTROENCEPHALOGRAM (EEG)

| Metric | Result | | Reference Range | Correlated Function |
|--|---------|---|-----------------|---|
| Peak Alpha Frequency (PAF) | 9.00 Hz | | 8.9 - 11 Hz | |
| Brodmann Area 6 (right) Medial Frontal Gyrus | 19 Hz | L | $\geq 2 \pm SD$ | visuo-spatial perception and attention, planning, mirror neurons, emotion processing, self-reflection, language, memory, motor, pain, touch, face and object recognition, auditory, ^{190,191} |
| Brodmann Area 6 (right) Medial Frontal Gyrus | 20 Hz | L | $\geq 2 \pm SD$ | visuo-spatial perception and attention, planning, mirror neurons, emotion processing, self-reflection, language, memory, motor, pain, touch, face and object recognition, auditory, ^{190,191} |
| Brodmann Area 40 (right) Inferior Parietal Lobule | 18 Hz | L | $\geq 2 \pm SD$ | emotions, self-reflections in decision making, attention (sustained and focused) ^{190,191} ; working/episodic memory, visuo-motor attention, auditory, gesture imitation, language, motor, pain, object and face perception, touch, balance ^{190,191} |

- Other EEG findings are noted. Refer to Digital EEG Analysis-Head maps.
- No deviations between $2 \pm SD$ and $6 \pm SD$. Measurements less than $2 \pm SD$ are considered normal. Measurements greater than $6 \pm SD$ are assumed to be due to excessive artifact.

 Clinician Signature