

BrainMARC

BrainMARC Monitor is an innovative, intuitive software application designed specifically for providing brainwave-based feedback in a variety of research settings. BrainMARC Monitor provides unique and reliable measures for attention, sustained attention and affect based on brainwave data from an easy-to-use, consumer electroencephalogram (EEG) headset.



Key BrainMARC Monitor Features

- ◆ A portable, compact, easy to use device (plug & play) that can be used anywhere.
- ◆ Compatible with a consumer EEG device (NeuroSky MindWave EEG headset) that uses only two dry sensors - for optimal user comfort.
- ◆ A real-time indicator of brain engagement, which reflects attention and motivation levels.
- ◆ A real-time indicator of affect, which reflects positive and negative emotion.
- ◆ Available measures:
 - Brain marker for focus events.
 - Brain marker for engagement.
 - Score for performance - excellent, good, reduced, or over engagement.
 - Brain marker for affect (positive and negative), with actionable information.
 - Brain marker for affect tendency (statistically significant slope of affect).
- ◆ The data can be synchronized with defined activity timestamps.
- ◆ The analyzed data of all indices used in a test are stored in a text file that can be easily transferred to any spreadsheet for further analysis.
- ◆ A report file is generated for each test and stored as a text file. The report includes indices used, timestamps, and media used. The output graph for each test can be stored in a picture format.

BrainMARC Monitor Benefits for Researchers

Combining a novel EEG platform with in-depth neuroscience understanding, BrainMARC Monitor offers an advanced and practical solution for brain feedback:

- ◆ Designed to optimize the use of brainwave feedback, the BrainMARC Monitor supports evaluation of different therapeutic strategies in order to achieve the most effective intervention.
- ◆ The BrainMARC Monitor is suitable for a wide range of subjects, including the minimally conscious.
- ◆ The BrainMARC Monitor provides an objective measurement that is relevant to a variety of research applications. It is particularly suitable for clinical studies seeking to determine attention, engagement and affect.



The Technology

Based on advanced algorithms developed during many years of multi-disciplinary research, BrainMARC (Brain Modeling & Analysis Research Company) provides concise and reliable indices for attention and affect. The algorithms are run on EEG data sampled via two dry sensors only ^{1,2}.

The brain engagement index (BEI) has been validated on hundreds of subjects and thousands of samples across a variety of clinical populations.

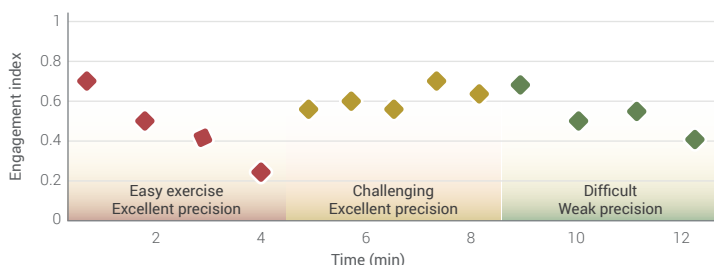
CLINICAL DATA

Neural rehabilitation clinical experience and research have demonstrated a correlation between the level of brain engagement (involvement) and the improvement of motor and cognitive learning.

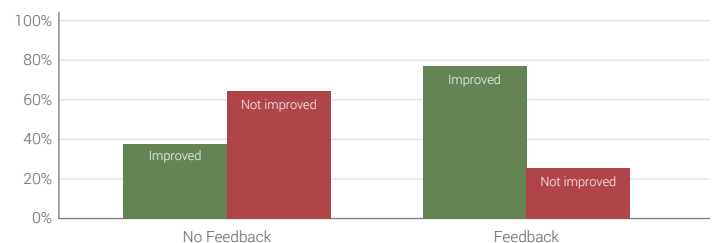
As a tool that provides online feedback regarding the effectiveness of attention recruitment during clinical sessions and which permits real-time adjustments in treatment to enhance attention, the BrainMARC Monitor can significantly strengthen neuro-rehabilitation effectiveness.

A clinical study evaluating the use of the BEI index for sub-acute and chronic-stroke neural rehabilitation patients has shown³:

- ◆ The Brain Engagement Index is low when the basic level of interest of the subject is low.
- ◆ A significant correlation between utilization of the online feedback and improved rehabilitation outcomes at the single patient level.
- ◆ Statistically significant evidence of an effective marker for online attention that is affected by the basic level of engagement as well as by the effectiveness of the ongoing specific exercise.
- ◆ The BrainMARC Monitor can be used while performing online tasks that require attention recruitment.
- ◆ The patient's attention is higher when the exercise level is challenging but not too difficult.
- ◆ When the exercise level is too easy or too difficult, the patient's attention is significantly lower.



Changes in BEI as correlated with the level of exercise difficulty



Relation between online use of feedback and significant improvement

¹ Shahaf, G., & Pratt, H. (2013). *Frontiers in human neuroscience*, 7.

² Shahaf, G., Fisher, T., Aharon-Peretz, J., & Pratt, H. (2015). *Journal of neuroscience methods*, 239, 183-193.

³ Bartur G, Joubran K, Shani-Peleg S, Vatine J.J., & Shahaf G. *Rehab science & technology Updates*. February 7-10 (2016). Poster presentation.

* BrainMARC Monitor is intended for research use only

