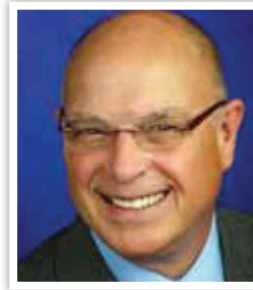


UNCOVERING THE BELIEF BEHIND THE ACTION

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INTRODUCTION

Our present research began many years ago while consulting with the Nebraska Cardiac Rehab Association. Ron was asked to observe client/staff interactions and make recommendations for improvement. The concern centered on the extremely dismal dietary compliance of patients who had recently had heart surgery. Session after session involved a patient admitting that they were not following the recommendations; consequently, the staff religiously gave them a new diet to try. Never once did anyone attempt to uncover why patients had not followed the first set of recommendations. What were these hidden self-destructive motives that would drive a person to, in essence, kill themselves?

With these lingering experiences, and now armed with the latest EEG BrainAvatar™ software from BrainMaster Technologies, Inc., Target Training International (TTI) Center for Applied Cognitive Research Lab designed a series of event-related potential (ERP) experiments. ERPs measure brain activity during cognitive processing. The transient electric potential shifts (ERP components) are time-locked to the stimulus onset. The process provides real-time exposure of subconscious factors with on-the-go noise reduction, thus exposing internal reactions and setting the stage for immediate open dialog with a client.

A local news release requesting volunteers with known wellness disorders was sent out and respondents were first administered a survey to expose their self-reported response to numerous wellness issues, including questions related to exercise, smoking, depression and general health. The survey also included a Likert-scaled set of words or phrases to which they were to provide their reaction from “strongly dislike” to “strongly like.” It should be noted that TTI has been in the business of creating and validating self-reporting ipsative surveys for over 30 years, with distribution to more than 90 countries and in more than 40 languages.

Once consent forms, medical history, and surveys were collected, each participant was asked to come to the lab for a one-hour EEG session. The protocol involved a stimulus/response data collection process in which key words or phrases from the previous survey were presented on a screen in front of the participant while event markers and EEG readings from 19 sensors were collected using BrainAvatar™. (Figure 1 depicts a sample EEG episode.)

Once data was collected, a patent-pending process was employed that quantitatively and qualitatively assessed the reaction of each stimulus. The VIDE (Validating Ipsative Decision-making with Electroencephalography) process not only provides the intensity of a

person’s emotional response to a stimulus by measuring voxel activation, but also provides emotional directionality by differentiating approach/withdrawal responses within the prefrontal cortex. Figure 2 provides a simplified explanation for reading these evoked responses.

Using BrainAvatar™, the process examines the asymmetric in the prefrontal cortex identifying gamma wave bursts to assess the underlying subconscious decisions behind these self-reported responses at the very moment of decision making. This process provides scientific evidence that an evoked emotionally-laden response results in corresponding brain activity and exposes the match to self-reported explanations. The process documents both the intensity of human emotional response as well as the directionality of the response.

This emerging technology and the patent-pending process allows TTI to not only validate and improve their existing assessments, but to create new approaches that expose the core beliefs behind our daily decisions.

THE PROCESS IN ACTION

The first step involves a person completing an online survey. Once that data has been analyzed, the client is connected to the BrainAvatar™ and shown a word or image from the previous online assessment. These stimuli are on the computer screen for 1 to 1.5 seconds, followed by a 1.5 to 2 second blank screen, thus linking markers for each stimulus to specific EEG output. Next, we review the asymmetry between the right and left frontal lobes to determine the individual’s level of avoidance toward a stimulus when first seeing it on the screen. Lastly, the BrainAvatar™ results

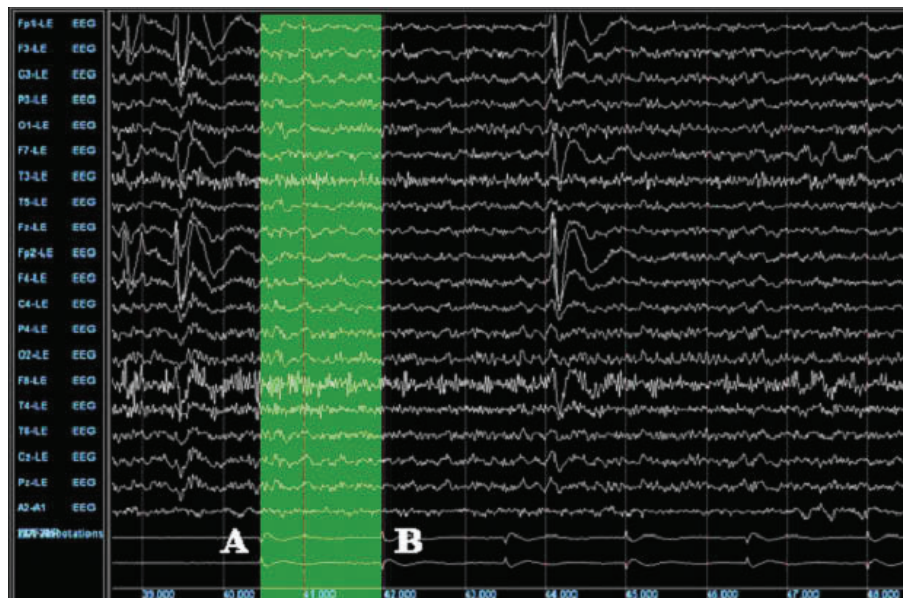
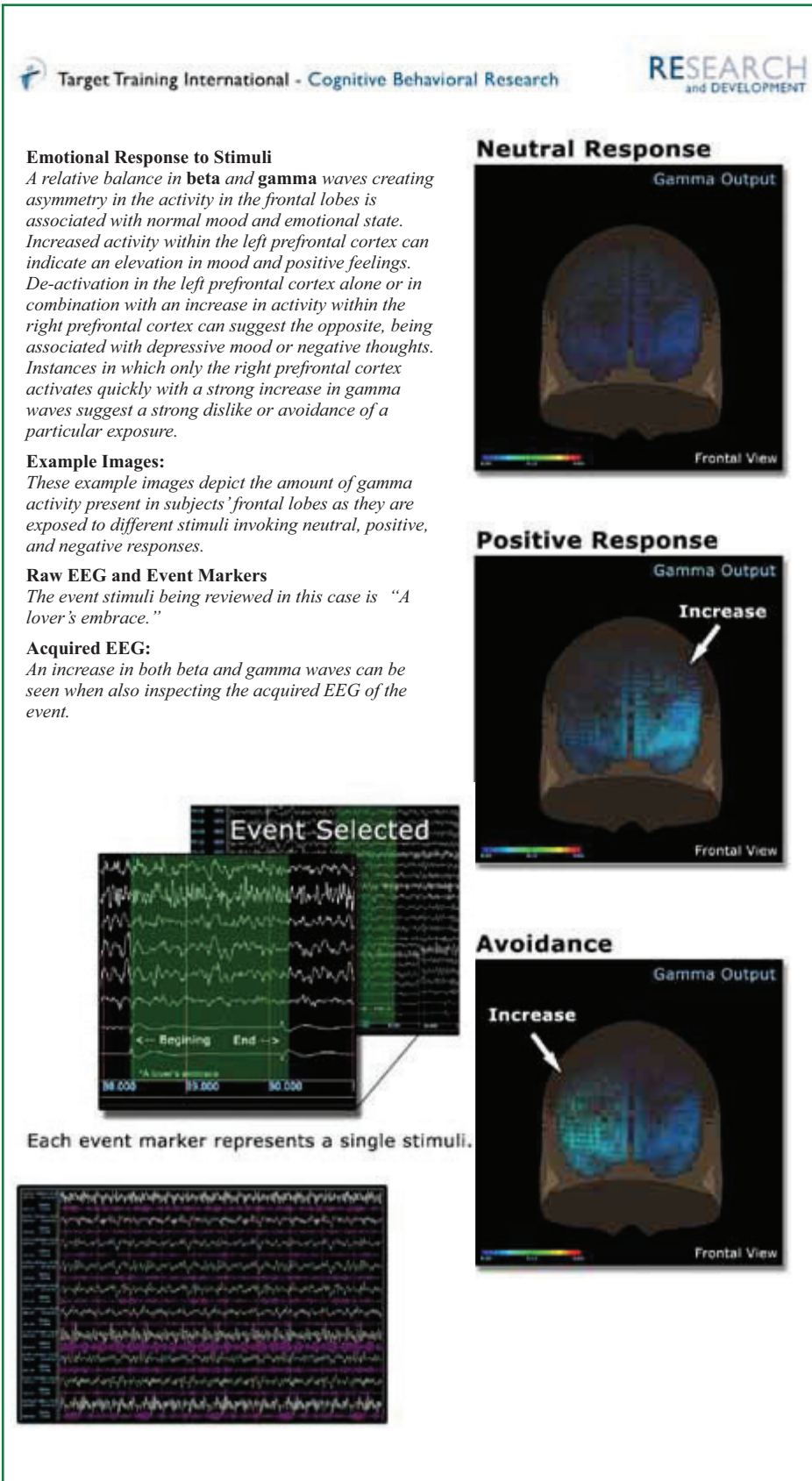


Figure 1
Raw EEG with Event Markers

BrainAvatar™ allows channels 23 and 24 to be used for additional data input. In this case, an E-Prime program, which is delivering the individual stimulus, sends 16-hertz signals to BrainAvatar. The letter A represents the starting point of an event and is identifiable when the markers from channels 23 and 24 come together. Letter B indicates the point in the EEG when an online stimulus ends and is identifiable by the markers separating. The EEG area depicted in green represents one stimulus event.

Figure 2
Explanation of Asymmetry in the Prefrontal Cortex



are compared to the clients' assessment results. From these results, a debriefing session is outlined.

With over 50 clients having been analyzed with VIDE, some of the most interesting recent findings to date are coming from over a dozen of our Wellness Survey Assessments and follow-up debriefings. One such assessment involved a participant that we will refer to as Sally. Sally became a participant as a personal favor early in the experiment. We needed a physically fit 20- to 30-year-old female for norming purposes of our wellness assessment and to test our ERP protocols. Sally has a Master's degree in nutrition and serves as a personal coach for a select group of nationally recognized athletes. With these credentials, we were expecting to see clear avoidance and acceptance to various stimuli and to examine a somewhat normal profile without pre-assessed wellness issues.

Figure 3 shows prefrontal cortex for gamma activity stimulus response. In this sample we see an extremely strong avoidance to the words "obese people" (increased activity in the right prefrontal cortex) and a similar but less intense reaction to "body fat." Even "fresh fruit" showed a negative reaction. The participant also responded to the survey with similar responses, thus showing a correlation between her ipsative survey and her brain activity and, in this case, affirming the accuracy of the original survey.

But the most interesting finding occurred during the debriefing. Sally was shown her resulting brain images as well as her initial survey responses. When asked why she was not more positive about fresh fruit, she responded, "Any food in excess is bad." When shown her brain reaction to "obese people," she paused and then stated, "I used to have a problem with anorexia."

We will come back to this debriefing comment, but it is important to note that this data followed by an effective debriefing has the power to open communication and ultimately reveal and confront core beliefs. In this case, Sally is still very much anorexic, at least according to her brain, even though she has found ways to control her urges.

Figure 4 comes from a participant who had recently been diagnosed with severe depression by her family doctor, but was not on medication at the time of the wellness assessment. The follow-up debrief opened a number of "talking points," including sleep deprivation, healthy food conflicts and her love of chocolate chip cookies. Her intense reaction to smoking was of particular interest. When quizzed she hesitated before explaining that the week before the assessment, she had been told that she had two dark spots on her lungs. She had not even told her family, but when confronted with this image, she opened up and started the process of reflecting on the implications of her physical and mental state.

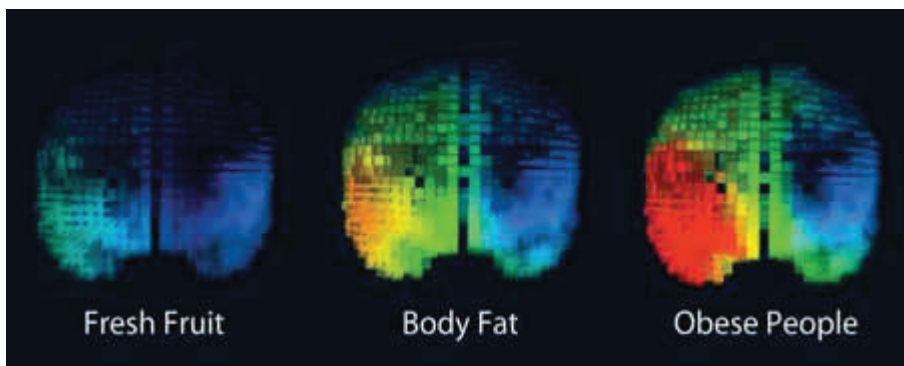


Figure 3
Three examples of ERP reactions. We see a progression of right prefrontal activation from a slight avoidance to fresh fruit to a rather major reaction to obese people, with body fat falling in the mid-range.

CONCLUSION

BrainAvatar™ and the protocols discovered by TTI’s patent-pending VIDE process are opening the doors to the very core beliefs behind our behaviors and emotions. As William Moulton Marston, the inventor and patent holder of the lie detector wrote in the 1920s, “Society would be better served by using this tool to modify behavior than to incarcerate people.”

The implications for clinicians are far-reaching and very exciting. BrainAvatar™ provides real-time noise-reduced images that expose the thoughts behind the action. Armed with this tool, psychotherapists can provide their client feedback without fighting the perceptions of top-down professional judgments. The data are coming from the client. No professional assumptions, no push-back or arguing over source or accuracy.

In addition, once baseline data are gathered, periodic monitoring can be used to visually document goal progress. The client is no longer a passive recipient of therapy but an active participant in the data analysis process and thus, an active participant in their own recovery.

Another important affirmation com-

ing from this research is the now-documented role of avoidance in decision-making. While several TTI assessments incorporate both avoidance and acceptance in the analysis, we now have scientific explanations for our assessment design assumptions. Our ERP experiments document that we simply are better at determining what we dislike than like. Our findings are consistent with the idea that people run their lives more to avoid certain things than they do to pursue them. This has implications for not only assessment design, but for debriefing protocols. Working with the dislikes allows us to expose the real drivers of behavior.

TTI believes that self-awareness is power; power to unveil our hidden beliefs that are holding each of us hostage in some way. When a person sees these images of their brain, they are confronted with the results of their mindsets in ways that allow them to begin the process of life changes.

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Dr. Bonnstetter also has served as editor of Science Education International, been invited as a visiting Professor to Venezuela, Indonesia, Cyprus, Brazil, Nigeria and Japan, hosted the 60 Second Scientist TV series, participated in the European Gordon Conference as a Featured Lecturer, and has served as a Board of Directors member for 9 regional, national and international organizations. In addition, Dr. Bonnstetter has served twice as a Delegate to the World Council of Science Education and was the first recipient of the National Senior Science Educator award. His teacher preparation program was the recipient of the National Search for Excellence in Science Education (SESE) Award for the outstanding Secondary Science Teacher Preparation Program.

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Target Training International Wellness Study Results

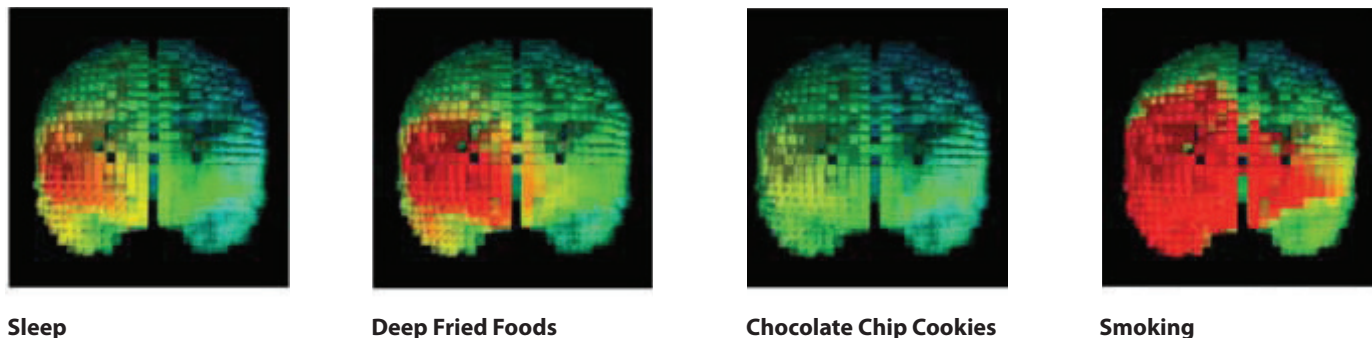


Figure 4
Figure 4 shows several images taken from the depression section of the Wellness Assessment. While right prefrontal cortex avoidance can be seen in each of the images, the intensity varies greatly. It is this variation that leads to follow-up dialogue.