

Electroencephalography (EEG)

EEG sensors are the most temporally accurate and reliable way to measure brain function, says **Thom Noble**, NeuroFocus Europe

ALL IT TAKES IS around half a second for the brain to register and react to something - anything - that you experience through any of your five senses. In that brief time, your subconscious has formed its perceptions.

EEG measurement of brainwave activity captures data in that first half a second at the subconscious level of the mind. EEG, which stands for electroencephalography, isn't new; EEG sensors have been used in laboratories for decades. So, they're time-tested to be the most temporally accurate and reliable way to measure brain function.

EEG measurement captures the genuine, quantified and previously inaccessible subconscious response of the consumer, instead of relying on often inaccurate recollections of how they felt or what they thought at any particular moment. Factors such as language, education, and racial, cultural or ethnic elements can, and do, influence and potentially distort consumers' recollections when they are asked to recall what they thought or felt when they experienced a stimulus.

Using fMRI

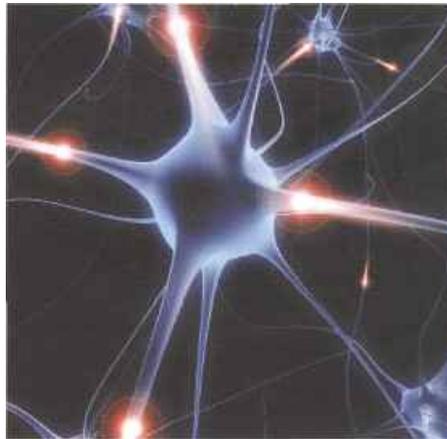
Another form of neurological testing is fMRI (functional magnetic resonance imaging). While fMRI is very useful as a medical and scientific methodology, it has inherent limitations for market research purposes. Testing is limited to a single subject at a time; subjects must remain prone and completely still; and the extremely expensive equipment cannot match EEG for temporal accuracy.

It takes highly sensitive equipment to 'hear' the tiny microvolts of electricity that brainwave activity emits. EEG sensors are designed to capture those signals. They also listen fast. EEG sensors capture brain-

wave activity 2,000 times a second. For EEG-based neuromarketing studies to be of maximum use and value to researchers and marketers, there must be full brain coverage by the sensors.

Because we measure brainwaves 2,000 times a second, across 64 sectors of the brain, and we accompany that methodology with pixel-level eye-tracking and galvanic skin response (GSR) measurements, we accumulate as many as five billion data points during a typical test (such as a 30-second TV spot) and we apply up to 40 billion floating number points of computational processing power.

When the data is translated into words



and numbers that are relevant and useful to researchers and marketers, it gets distilled down into three NeuroMetrics: attention, emotional engagement, and memory retention. Why these three? Because neuroscience teaches that they are the prime indicators - the building blocks - of purchase intent. If your TV commercial, product package, store environment or movie trailer doesn't capture a consumer's attention, they will not become emotionally engaged. If they do not become emotionally engaged, they are not likely to remember. If they do not remember, they are not likely to buy, or watch. We derive three more indices from the primary NeuroMetrics: market performance indicators of purchase intent, novelty, and awareness.

Awareness is fairly self-explanatory. Purchase intent is a measurement of how well your stimulus has moved the consumer towards a decision to buy (or watch) something. Novelty we define as the ability of your stimulus to stand out and form subconscious defences against competitive messages.

Space considerations prevent a fuller description of the host of other findings

that neurological testing can produce. Nor can I go into detail here about how they are translated into specific, actionable recommendations for how to improve the stimulus material. Suffice it to say that, for clients, this capability is one of the factors that render neurological testing a powerful tool for achieving marketplace success.

Neurological testing in action

Here's a real-world example: a major international pharmaceutical firm wanted to evaluate how effective a TV commercial was for its brand of allergy relief eye drops. EEG testing, coupled with eye tracking and GSR measurements, revealed the following on a split-second by split-second basis:

- The overall effectiveness of the TV spot, compared against our normative database of category-specific TV advertising
- Key points of difference in subconscious responses, by gender
- The degree to which the spot generated purchase intent
- The degree of awareness achieved
- The novelty index for the ad
- The degree of memory retention of key language and brand imagery
- Precise measurement of the commercial's 'wear-out' factor.

Along with a great many more results, specific recommendations were made to improve the commercial's effectiveness:

- Identifying which key words and phrases resonated the most at viewers' subconscious levels
- A more effective approach to using the concept and word 'new'
- Copy changes to improve the impact on both male and female audiences
- Shifts in media planning and buying strategies to heighten the ad's ROI (reach versus frequency parameters)
- Neurological compression to enable the ad to be used with the greatest neurological impact across multiple alternative platforms (internet, mobile, print).

The cost for this form of neurological testing can vary from \$50,000 to over \$1m, depending upon the complexity of the project and the scope of the materials, and audiences, tested.

It might seem like a high cost but, considering that the results are scientifically proven to be the most accurate of any form of market research, the investment can prove very worthwhile.