NEUROMARKETING –
Where psychology meets marketing

"The trouble with market research is that consumers don't think how they feel, they don't say what they think, and they don't do what they say"
- **David Ogilvy**

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Prologue

Have you ever been driving along a motorway lost in your own thoughts, and suddenly found yourself 10 miles up the road with no conscious recollection of how you got there?
Although you were not conscious of it, your non-conscious brain processes were performing that task pretty well, and would have alerted you to danger the split second it detected it.

Have you got clothes in the cupboard you've never worn, or tools you've never used, even though at the time you were buying them, you felt sure they were just what you wanted?
Changes in your brain's chemistry – at different times of the day and even week – effect the way you process information. So promises you make on one day may seem entirely inappropriate on another.

Problems giving up a habit like chocolates or alcohol? You know you really want to give up, but why is it so hard – after all, you're in charge of your own brain aren't you?
Well, sadly not. The reason why it's so hard to give up habits, even when you are fully conscious of the desire and need to, is that cravings are driven by parts of the brain that operate below the level of our awareness, and don't much like being dictated to by the conscious speaking brain.

Applied neuroscience explains such everyday riddles. And this is because it gives us the ability to go deep inside the brain, the seat of all our emotional impulses, to decipher how consumers feel.

Crucially, neuroscience allows us to unearth powerful insights into people's thoughts and feelings, insights that marketers can then use to develop accurate communication strategies that resonate within our consumers' minds.

Neuroscience is defining the future of marketing - it is unlocking the power of emotions and changing the way we listen, converse, persuade, engage and sell.

Did you know?

The term ''neuromarketing'' (NM) is a recently invented moniker. The Economist (2004) credits Jerry Zaltman with initially proposing a union of brain-imaging technology with marketing in the late 1990s, and when the Atlanta marketing firm, BrightHouse, opened a neuromarketing division in 2001, the synthesis of neuroscience and marketing began to attract attention in science, business, and journalism.

Why does it matter?

For businesses and brands to grow and succeed, it is crucial that we understand what consumers really want. And yet, more than seven out of ten new product launches fail within one year of introduction, even after validation by traditional market research. As this above statistic chillingly proves, predicting fickle consumers is notoriously difficult.

The premise that people behave in a predictably rational way has always been subject to debate. Several studies have proved today that a dominant part of human behaviour is driven by psychological non-conscious processes rather than their stated conscious responses[1].

Brain scanning is furthering this scrutiny by demonstrating the enormous influences our emotions have in every decision we make. In fact, a person's brain seems to commit to certain decisions before the person becomes aware of having made them.[2, 3]

Events that are familiar generate little brain attention. Those that are familiar and pleasurable attract us, while events recognized as threatening repel us. When we come across something completely new, our brain's first response is to relate it to something familiar. Only if that does not automatically (instinctively) determine how we should respond, the conscious mind will step in to figure things out[4].

This simple insight has tremendous implications for marketing. Given that most of our behaviour is primarily driven by non-conscious processes, to truly understand what consumers want, we need to measure how consumers feel (and not just how they think)

Enter Neuromarketing - a rapidly evolving field that seeks to apply insights obtained by neuroscience on how consumers FEEL to marketing and communications actions.

Case study: Using scents in marketing

Scent is one of the five senses that are heavily connected to emotion. Think of those situations when a particular scent rushes us back to specific memories.

Many marketers are using this insight to drive consumer preference. Restaurant chains like McDonald's have open kitchens to allow consumers to smell the brand. Rolls Royce reproduced the scent of its great seller, the 1965 Silver Cloud, and sprays it under the seats to recreate the scent of this classic "Roller". Singapore Airlines has gone so far as to patent a scent of lotus flowers and bamboo forests that is worn by flight attendants and put on hot towels handed to passengers before takeoff.[5]

These brands are creating a relationship in the subconscious minds of consumers, aligning a positive brand experience with a pleasant and unique scent.

A quick introduction to neuroscience

Neuroscience is the study of the human brain – how it has evolved over time, how it grows as we age and most importantly, how it works.

Today, modern brain imaging technologies literally allow us to see inside the brain while people are exposed to different stimuli or perform specific tasks. Hence, it is now possible to measure non-conscious brain processes such as memory encoding, preference, attention, trust and brand loyalty[6]. In turn, measurement of these non-conscious feelings leads to a more reliable predictor of consumer behaviour.

The first of these techniques, introduced in 1924 and refined in the late 1970's is a technology called electroencephalography (EEG). EEG monitors changes in the distribution of electrical currents from the scalp surface associated with brain activity. It monitors these changes in electrical activity in near real-time and is a good measure of attention[7].

However, because the EEG captures signals from the scalp surface, it is limited in terms of monitoring activity that occurs deep inside the brain (such as memory, craving, trust). This limitation was overcome in the early 1990s with the introduction of functional magnetic resonance imaging (FMRI) which measures brain activity across the whole brain because it measures activity at the source (rather than at the scalp surface)[8]. Knowing WHERE brain activity is occurring during a particular task is vital if you want to understand WHAT the nature of the activity is – because different brain areas are involved in different functions.

Finally, eye-tracking techniques, pioneered in the 1970s, offer a useful way of measuring visual attention (when eye movements are so fast we are unable to accurately report on what we're attending to in the visual scene) and can do so in a natural scenario (i.e. in a supermarket rather than a lab) – but is unable to reveal what consumers are thinking when their eyes fixate or search particular parts of space[9].

Using neuroscience techniques to gain consumer insight

Implicit associations: taps into the implicit biases that people create about brands and products. It asks the respondent to react very quickly, via a computer program, to a set of attributes that he or she feels is best associated with the brand[10, 11]. As a crude example, do people respond faster when a large bank logo is paired with attributes such as 'safe, trustworthy, understanding' or 'mean, untrustworthy, old-fashioned'?

How does this work? The respondent is 'primed' through exposure to a brand, product or piece or advertising. This serves to stimulate the full network of stored associations for the primed stimulus within the brain. Since the brain finds it easier to use pre-stored associations, when shown a series of apparently random words, this bias cause the respondent to choose words associated with our stimuli more frequently and more quickly. Thus, without ever asking directly and allowing the conscious mind to intervene, we are able to identify the implicit associations that have been stirred up.

So, the next time you want to measure which one of several celebrities or models best fit a particular brand or campaign – fast, easy to use, online behavioural tools do a pretty good job at extracting consumer's implicit biases

That said, such tools only measure responses to those attributes that you include in the task and cannot reveal any information about the attributes or emotions that might actually be taking place, should these differ from those you've selected. Hence, the need for the following two techniques - Electroencephalography (EEG) and Functional magnetic resonance imaging (FMRI):

Case Study: The failed GAP logo change[12]

There's actual brain chemistry at work when a person rejected the new GAP logo. Neurofocus used EEG and eye-tracking techniques in a series of tests to gauge volunteers' response to the new Gap logo. Here were their results:

Overlapping the letter "p" with the blue square means that the word is ignored while the brain selectively processes the image. In other words, the distracting sharp-edged blue cube makes the reader miss the all-important brand name. Secondly, and more importantly, by having the last letters of the word in lower case, the brain is prompted to look for a semantic meaning in the word, which was making it hard for people to attach what they already know about the brand to the new logo.

Electroencephalography (EEG): records electrical brain activity from the scalp surface using an array of electrode soft caps placed as a non-threatening cap on respondents heads. This helps record the activity emanating from the brain in near real-time

It is a useful tool for measuring changes in respondent attention over very fast time intervals such as when watching a television advertisement. Hence, we can tell at what particular point in time (i.e. which frame(s) of the advertisement) is having an impact on the brain.

Note of caution – The EEG can measure the attention levels, but it cannot measure the nature of emotions associated with this attention. Hence, it can tell us that a particular frame caught the respondent's attention, but we cannot unambiguously tell whether he loved it or hated it!

In sum, if you want to measure non-conscious reactions such as awareness or attention, or whether people may be approaching or withdrawing from an ad campaign on a near frame-by-frame basis, EEG does this well.

Case Study: Post Shredded Wheat, USA[13]

A new provocative TV commercial called "Progress" from Post Shredded Wheat (PSW), generated a substantial buzz. But the sales results of the campaign failed to meet expectations. To understand this better, PSW evaluated the commercial by combining the well-established Millward Brown Link™ pretesting system along with the emotional engagement insights of quantitative EEG brainwave measurements.

Combining the results from the two studies showed that the ad was engaging, but polarizing. It showed that although the ad involved viewers, it left them struggling to connect the ad to the brand. Additionally, the confusion created at certain points in the ad interfered with enjoyment for some viewers, resulting in weak break-through for the TV commercial.

As a result of the research, learning was integrated into a new Post "Natural Advantage" campaign based on health and wellness benefits, such as natural fiber and antioxidants, and not solely focused on being 'provocative'.

Functional magnetic resonance imaging (FMRI): is the latest of all neuroscience advances. It measures changes in the distribution of oxygen throughout the brain as a measure of neural activity[8].

By measuring the activity inside the brain with very high spatial resolution (activity in areas that lie millimetres apart), we can precisely determine where the signals are coming from, and therefore, what kind of emotion is being elicited. And through this process, we can discriminate emotions like anxiety, craving, trust, distrust, conflict, pleasure, pain, comprehension, attention, engagement, relevance and many more.

One of the often stated drawbacks is that the FMRI can only be used in the lab and the FMRI machine may be intimidating to the respondent. But, numerous academic studies have refuted this and shown that the FMRI responses correlate with behaviour outside the scanner. For example, studies which track people's eye movements while they engage in a virtual shopping exercise in-store while in the FMRI scanner have shown that people's shopping behaviour and visual attention is almost identical to that seen when eye-tracked in the actual supermarket.

In sum, if you want a much more in-depth and accurate assessment of (often implicit) psychological functions such as brand loyalty, trust, understanding, memory encoding, inhibition, anxiety, pleasure and craving – functional MRI is the method of choice.

However, fMRI does come with some disadvantages. While it offers high spatial resolution, the fMRI lacks in temporal resolution. Since it takes almost two seconds to get one scan of the brain, it cannot track fast changing stimuli as well as static stimuli. Secondly, since it remains a 'lab' procedure, the fMRI presents cost and scale limitations.

Case study: Royal Mail, UK[14]

Virtual media seems to have exploded at the cost of physical media, such as print and direct mail. The UK's Royal Mail wanted to understand whether there are any differences in the communications effectiveness of physical and virtual media

Millward Brown, along with Bangor University, used functional Magnetic Resonance Imagery (fMRI) scanning to understand how the brain reacts differently to physical and virtual stimuli, with particular focus on the emotional processing evoked by the different forms of media

Tangible materials leave a deeper footprint in the brain primarily because the physical materials stimulate both sight and touch. This suggests that physical material is more "real" to the brain. That is why physical material (shown on cards) generated more activity within the area of the brain associated with the integration of visual and spatial information (the left and right parietal).

Physical material involves more emotional processing, which is important for memory and brand associations. Physical materials also produced more brain responses connected with internal feelings, suggesting greater internalization of the ads. The brain's "default network" appeared to remain more active when viewing direct mail, which suggests that the individuals were relating information to their own thoughts and feelings.

This research strongly suggests that physical material generates greater emotional processing and become a stronger part of memory. More importantly, because physical material has a more personal effect, should aid purchase motivation.

Eye Tracking: measures the position and movement of the eyes as respondents view visual scenes and images. This detects the direction and duration of fixation and is an excellent measure of visual attention. Hence, it helps identify what is attracting attention, particularly when eye movements are so rapid that we are unable to introspect and report on what we are looking at over time (for example – when browsing a shopping aisle)

Unfortunately, like implicit associations, eye tracking mostly does not discriminate between positive or negative emotions, so the interpretation is limited to visual attention. There have been some recent developments to overcome this drawback where eye-tracking has been combined with FMRI to find out not only what people are attending to when they navigate a supermarket or website, but also precisely what emotional responses they have as they fixate or search specific parts of the visual scene.

Summing up, if you want to know what people are attending to across a complex visual scene, then eye-tracking provides an ideal tool to measure this in a natural environment.

Case Study – Campbell's soup[15]

Campbell's soup employed a combination of eye-tracking in combination with a deeper interviewing process in order to receive both conscious and unconscious consumer feedback on the effect of its soup can labels and in-store aisle displays.

Eye tracking results showed that found that most respondents were overpowered and distracted by the massive red and white wall of soups (because of the prominent logo). They had very little emotional engagement with the product; instead they would quickly scan the section to the soup they want. Interestingly, the few who did take time to look at the varieties had a greater biometrically evident emotional response and ended up putting more cans in their baskets. To resolve this, the Campbell logo was minimized and relocated to the bottom of the can. Further, the varieties were divided into four color-coded categories to facilitate search.

Secondly, it was not the silver spoonful of soup that elicited an emotional response; it was the image of the warm soup itself. A simple act of adding steam to the image of the soup dramatically increased engagement and emotional response.

A ready reckoner of the applicability of the various techniques described above has been enumerated by Jane Leighton, a Post Doctoral Research Fellow at University College London (see chart below).

	Eye tracking	EEG	fMRI
Accurate measure of attention	Yes	Yes	Yes
Accurate measure of emotion	No	No	Yes
Accurate measure of memory	No	No	Yes
Measures actual behaviour	Yes	No	No
Can measure response from all brain areas	No	No	Yes
Can measure responses from all senses	No	Yes	Yes
Highly sensitive to timings	Yes	Yes	No
Can be used outside the lab	Yes	Yes	No
Can be used for static and moving stimuli	Yes	Yes	Yes

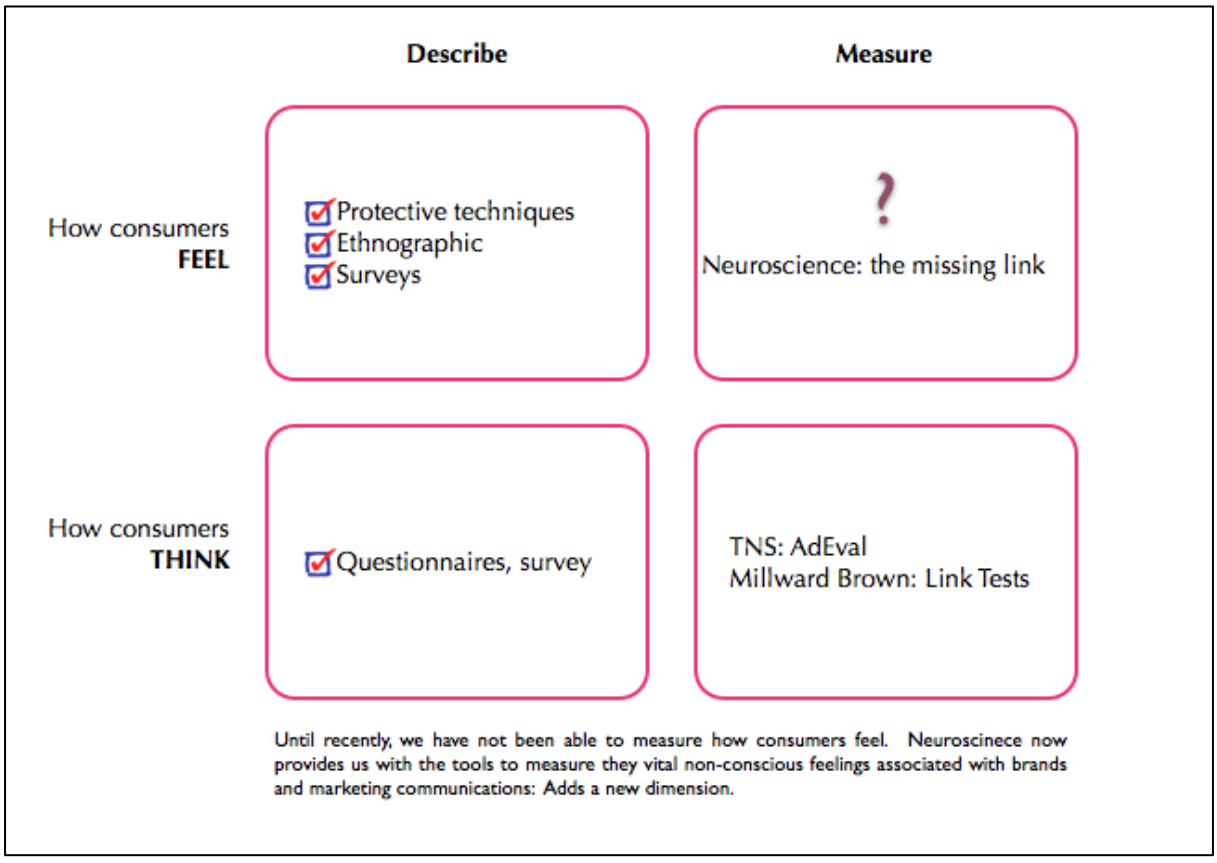
Some less often used neuroscience techniques (mentioned below) have not been covered in detail in this paper

1. Galvanic skin response (GSR)—is a technique that measures the subtle changes in skin (such as temperature and sweat) that occur in conjunction with certain emotions.
2. Electromyography (EMG) is a measure frequently used as an indication of primary emotions. It is a technique for evaluating and recording the activation of facial muscles responsible for emotional expression.

How does Neuro intersect with market research?

All scientific methods have limitations and neuroscientific tools are no different. Each tool has its own relative advantages and disadvantages. While no one tool provides a litmus test of predictability, in almost all cases these tools provide a level of objectivity, and improved accuracy, that far exceeds traditional tools that rely solely on respondent introspection.

Secondly, most of these techniques also require highly skilled individuals to design, analyse and interpret the data unlike conventional research which has cultivated a large talent pool over time.



Case study: There are different kinds of brand loyalty[16]

To gain a better understanding of the drivers behind brand loyalty and use this to inform the creative process, Neurosense conducted an FMRI study of brand loyalty.

Two brands were tested in this study – a Japanese soccer team Gamba Osaka and the U.S. motorcycle brand Harley Davidson. While both of them have passionate and loyal fan bases, Gamba Osaka fans are also strongly competitive i.e. have a antagonistic relationship with other soccer brands. On the other hand, Harley commanded a loyalty driven by the experience of the brand, independently of any competition. The brain activity of volunteer fans was scanned while presenting them with various forms of visual stimuli related to their respective brands.

The results showed that specific areas of the brain are activated when consumers see brands they are loyal to. In other words, the more active the brain map, the more loyal consumers are to that brand.

Interestingly, rather than there being one generic engagement mechanism, the mechanisms at play in forming fan-brand engagements differed between the two groups. The study confirmed that for Gamba Osaka fans, the visual stimuli activated areas of the brain associated with memories and preferences—the same activation areas discovered in earlier overseas fMRI research on leading beverage brands. Conversely, these brain regions were not activated as strongly in Harley Davidson fans; instead, the stimuli activated the area associated with empathy.

Also different specific images help this differential definition of loyalty. For brands that occupy competitive space (e.g. Pepsi vs. Coke, or even football teams (Gamba Osaka vs. Marinos), activation of brand loyalty networks was maximum when consumers saw their logos, uniforms, players and competitive images. For brands that promote a unique product experience without obvious competition, images of the riding and owning experience have the greatest effect on these networks.

IN conclusion, fMRI studies can demonstrate the degree of loyalty, nature of this loyalty and the specific stimuli that can further re-enforce this loyalty of the brand among its core audiences.

How are marketers using neuroscience today?

Over the past years, marketers have used neuroscience across a spectrum of opportunities*

- To identify product consumption and pathways to decision making
- To understanding the impact of packaging design
- To evaluate the appeal of innovations
- To understand the impact of pricing cues on brand image
- To support product claims (does this fragrance REALLY make you feel calm?)
- To predict whether certain brand extensions are going to work
- To improve media planning by matching campaign content with media usage
- To measure brand loyalty
- To find out what people are focusing on in-store, along shelves, on websites
- To measure the effectiveness of ads and campaigns
- To understand gender, age and cultural differences on consumption
- To decode the influence of creative communications on purchase decisions
- To understand shopper motivations

** Detailed case studies on any of these topics can be shared on request*

At the very cutting edge, marketers are developing "biomarkers" of emotions that are hard to verbalise, such as trust, brand loyalty, brand empathy – and using these patterns of brain activity as markers against which new products and prototypes can be tested and tweaked.

Case study: Brain Scans Predict When People Will Buy Products[17]

The hypothesis of this study by Cornell University was that distinct brain regions would be activated when people were presented with products they wish to purchase (representing a potential gain) and when they were presented with those products' prices (representing a potential loss). The researchers wanted to see if they could then use this information to predict when a person would decide to buy a product, and when they would pass up.

Twenty-six adults were given $20 to spend on a series of products that would be shipped to them. If they made no purchases, they would be able to keep the money. The products and their prices appeared on a computer screen that the participants viewed while lying in an fMRI scanner. It was found that when the participants were presented with the products, a subcortal brain region known as the nucleus accumbens that is associated with the anticipation of pleasure was activated. When the subjects were presented with prices that were excessive, two things happened: the brain region known as the insula was activated and a part of the brain associated with balancing gains versus losses (the medial prefrontal cortex) was deactivated.

Furthermore, by studying which regions were activated, the authors were able to successfully predict whether the study participants would decide to purchase each item. Activations of the regions associated with product preference and with weighing gains and losses indicated that a person would decide to purchase a product. In contrast, when the region associated with excessive prices was activated participants chose not to buy a product.

Credentials of our Neuromarketing partners

Neurosense is the world's longest established independent applied neuroscience company. The company specialises in applying insights and modern technologies derived from the fields of psychology and cognitive neurosciences to help organisations better understand consumer behaviour. The business brings together the highest standards of academic neuroscience and marketing expertise. Since 1999, Neurosense has been providing neuroscientific research services worldwide to a broad range of international companies across multiple industry sectors including advertising, media and broadcasters, pharmaceutical, consumer packaged goods, flavours and fragrances, food and beverage, and financial services. Uniquely, Neurosense is the only company offering the full range of psychological and neuroscientific tools currently available and specialises in combining technologies for maximum consumer insight.

Millward Brown is one of the world's leading research agencies and is an expert in effective advertising, marketing communications, media and brand equity research. They have been running neuroscience projects for around 8 years. In 2010, they became the first major research agency to launch a dedicated Consumer Neuroscience Practice. The Millward Brown Neuroscience Practice focuses on techniques, such as EEG, Implicit Associations Measurement and eye-tracking, those are robust, practical and can be scaled to serve clients across the globe.

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