

ISSN 1833-3850

A journal ranked Australian top 10 journal of management

A journal archived in National Library of Australia

A journal indexed in APAIS(the Australian Public Affairs Information Service)

A journal delivered to more than one thousand public and university libraries

# INTERNATIONAL JOURNAL OF Business and Management

[www.ijbm.net](http://www.ijbm.net)

Vol. 2, No. 6

December 2007

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# Neuromarketing: Will It Revolutionise Business?

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## Abstract

Neuromarketing, the latest form of marketing study and practice, is the study of the brain's responses to advertising and all the messages and images that they are associated with by using the functional Magnetic Resonance Imaging (fMRI). It assumes that the human brain has discrete functional areas and that consumer behaviour is largely driven by the subconscious. NM has been regularly used for about five years now by major corporations across a wide spectrum of categories and has received much attention from popular press. It has also elicited severe opposition from consumer groups which argue the dangers of mind control. However, NM's fundamental premises are weak, it lacks empirical proof and is also used to further economic and political interest. The authors are thus sceptical about NM's true effectiveness and believe that it is more hype than substance.

**Keywords:** Marketing, Neuromarketing, Subliminal Messages

## 1. Introduction

In today's hyper competitive markets even the slightest of insights is welcomed by companies to improve the effectiveness of new product introductions and marketing communications. It is undeniable that traditional consumer research techniques, such as surveys and focus groups, help in this regard. However, they do suffer from two important limitations, as consumers are not always able or willing to provide the required information (Ahuja, 2006). For decades market researchers have attempted to address these shortcomings by either trying to access the consumer's subconscious, for example through motivational research and projective techniques, or by analysing how consumers seek and process information, for example by tracking eye movement or galvanic skin response (Widing, et al., 2003). However, these efforts have been only partially successful in helping to understand consumers. One of the latest techniques, which incorporates both of the above mentioned approaches and is hailed by many as one of the most important marketing research breakthroughs, is neuromarketing (NM), defined as the application of neuroimaging techniques for marketing research purposes (Sutherland, 2003; Applebaum, 2005; Lee et al, 2007).

The recent application of neuroimaging techniques in marketing research has received much attention in the popular press (e.g. Mucha, 2005; Withalls, 2004). As noted in a recent editorial in *Nature Neuroscience* (2004), this has led to media hype that marketers will be able to track exactly what consumers are thinking and feeling, and thus create marketing stimuli that consumers cannot resist. This perspective anticipates a fundamental change, or revolution, not just within the discipline of marketing but also the wider business practice.

The paper begins with a brief background on NM, addressing its origins, how it works and its uses. The authors then address the benefits and results obtained by NM, as well as the weaknesses of this approach. Finally, and as a conclusion, the central question of whether or not NM really works for the business and commercial world is addressed followed by some recommendations.

## 2. The Beginnings of Neuromarketing: The Human Brain

NM is related to information processing techniques, or alternatively, that it researches the physiological or biological processes involved in human decision and action. Ever since the Egyptian time, the brain was thought to be a potential part of the human being. The Greeks began to understand how the brain works thought that emotions and feelings were produced by the heart; we know today that it is processed in the brain. In the Dark Ages, superstitions took over reason and religion was the center of the human beings, therefore the brain was left aside for a period of time. Even in the renaissance time, little of the brain was studied; the problem of studying the brain is that there are only two ways of studying the brain, the first one is by making a cessation on the brain and watching the change behavior, the second one is by stimulating certain areas and seeing what happens.

Around the late 1700, Franz Gall created a cerebral map because he believed that certain areas of the brain were involved in specific tasks, he called this new science "Phrenology", which has since been discredited. There is some truth in his findings, for example, Paul Broca (1824-1880) discovers that there were specific areas in the brain that specialize in language, now we call this area Broca's Area, however most of the brain does not work by area, it's an extreme network of neurons and is all communicating with each other. Neuron was not familiar to the scientific community until Santiago Ramon Y Cajal (1852-1934), a Spanish neuron scientist, discovers the neuron and was given the noble prize for it (1906). In relation to understanding the brain, Phineas P Gage (1823-1860) was the first documented case of behavior change due to cessation in the brain. In September 1848, in Cavendish, Vermont, an

incident occurred which was to change our understanding of the relation between mind and brain. Phineas P Gage, was a railroad worker when an explosion blew an iron bar right through his skull, he did not die but his behavior change radically. He became fitful, irreverent, impatient, capricious, and indulge in profanity.

For centuries scientists believed that the brain had regions that were responsible for different functions. These functional areas could be fairly broad, dealing for example with rational information processing or subconscious emotions (Grose, 2006), but also quite specific, dealing with for example vision or motor control (Tiltman, 2005). Even though the brain had been formally studied for hundreds of years, it wasn't until the late 1990's that modern brain imaging technology started to be used for marketing research purposes. Researchers at Harvard University developed this new approach in order to test and improve the effectiveness of ads. The rationale for this was based on estimates made by neuroscientists who indicated that as much as 95% of brain activity could be subconscious (Zaltman, 2003). Further, since behavior is largely caused by emotion (LeDoux, 1998) understanding emotion, which is largely unconscious, would lead to the understanding of behavior (Barrett et al, 2007), which is what marketing research ultimately seeks to accomplish. This being the case, consumers might be driven toward preference, purchase and loyalty if their subconscious emotions are stimulated appropriately. More specifically, if marketing targeted brain areas associated to reward, empathy, bonding (Nadkarni, 2006), curiosity, pleasure (Dias, 2006), identity (Mahoney, 2005), attention, concentration and memorization (Tiltman, 2005), marketing efforts would yield superior results. Thus the field of NM was created, which set out to study the location, timing, strength and frequency of brain activity in response to marketing stimuli (Neuroma, 2007).

Stimuli used in NM can be visual, aural, olfactory, tactile or any combination thereof, with the potential to cover a wide marketing elements such as products, packaging, pricing, and advertising, among others. Those stimuli that generate the strongest and most positive reactions during research are later reinforced to improve the effectiveness of marketing efforts (Grose, 2006). NM uses different neuroimaging technologies with fMRI (functional Magnetic Resonance Imaging) being its main one (Smidts, 2002). This technology, originally intended for medical research, relies on strong magnetic fields and radio waves to trace the flow of blood into the areas of the brain where neural activity is taking place (Grose, 2006). By taking snapshots every couple of seconds, extremely accurate and detailed three-dimensional images can be obtained describing how the brain is reacting and processing marketing information (Tiltman, 2005).

Given the required neuroscience equipment, as well as trained and experienced specialists to interpret the data, NM consultants work closely together with hospitals or research facilities. NM is thus quite an expensive proposition, costing about three times as much as focus groups (Bourdeau, 2005) and averaging about US\$150,000 per project (Grose, 2006). However, as competition increases, technology improves and institutions increasingly lend themselves to this type of research, costs are bound to decrease, making NM increasingly available to smaller organizations and thus more commonly used (Reid, 2005).

### **3. Neuromarketing Revolutionising Business**

Advocates of NM argue that analyzing consumer's subconscious reactions towards marketing variables provides a far better understanding than conventional business research methods. Since subconscious reactions are typically involuntary, meaning they cannot be faked, hidden or moderated, they provide objective and reliable insights, ideally suited for market research (Ahuja, 2006). This in turn allows marketers to develop a more effective marketing mix and ultimately satisfy consumers better, marketing's central tenet (Grose, 2006). Further, since consumers tend to react differently towards stimuli, there is also the possibility of using NM for segmentation purposes, beyond mere demographic and psychographic variables (Hardingham, 2006). Taken to an extreme, and subject to technology, NM could also eventually be used to customize products and marketing communications according to brain type (Mahoney, 2005), perhaps someday even in real time. Ironically, much of the support of the effectiveness of NM comes from its very detractors. Those against this practice accuse it of scientifically pursuing the "buy button" in consumers brains, with the potential to create irresistible campaigns, overriding individual's freedom of choice (Nature Neuroscience, 2004), turning consumers into "roboshoppers" (Grose, 2006), and having them salivate like Pavlov dogs (Reid, 2005).

But beyond what supporters or detractors say, interesting insights have been obtained. For example, NM determined that the subconscious interacts and influences the newer parts of the brain, where logic and rationality reside, guiding decisions (Grose, 2006). In the particular context of shopping decisions, neuromarketers determined that when a product captivates a shopper, the analytical activity of the brain declines giving in to a largely emotional response. Researchers also discovered that when people are shown cool products, they have increased activity in brain areas associated with self image, identity and status. Most interestingly, subjects even showed increased activity in a cerebral region involved in planning movement. Even though they were strapped to a scanner, they were subconsciously reaching out for the product, a reaction most marketers can only dream about (Mahoney, 2005). But emotions not only impact immediate and short term decisions, such as impulse purchases. They also exert considerable degree of influence on long term decisions by determining how factual information is later processed. Thus, if the emotional content of a message is appropriately designed and timed, its impact, even long term, can be

optimized (Mucha, 2005).

This view is consistent with NM studies in the area of branding. Neuroimaging techniques have been utilised to identify some of the cognitive and affective responses elicited by brands. One particular study for example, has emphasized the influence that brands have on consumer preferences (McClure et al., 2004) by subjecting participants in a blind taste test while recording their neural activity using fMRI. Without knowing which beverage they were drinking, approximately half the respondents stated a preference for Pepsi over Coca-Cola (Coke). In the second stage of the same study, subjects were given a labelled cup of Coke, and a second unlabelled cup of Coke, which they were told contained either Coke or Pepsi. Despite the fact that cups contained Coke, approximately three quarters of respondents stated a preference for the labelled cup of Coke. Most interestingly, the fMRI scans showed that when respondents saw the Coke brand before tasting Coke, significantly greater brain activity was observed in the dorsolateral prefrontal cortex, hippocampus and medial prefrontal cortex (a part of the brain that controls higher thinking). In contrast, the sight of the Pepsi brand before tasting had so such effect on consumers (McClure et al., 2004). The findings of this study indicate that brands (in this case, Coca Cola) can significantly influence consumers' neural responses and behavioural preferences – preference was not determined solely by senses such as taste, but was based on prior affective bias brought about by the brand. For businesses, this implies that companies that establish strong brands will have a significant advantage in terms of ability to achieve market dominance.

Given the pressures to obtain a competitive edge, a whole NM industry has emerged across the US and Europe, with specialized research firms offering their services (Lee et al, 2007). The use of NM is increasing and has already been regularly employed for about five years now by major corporations across a wide spectrum of categories (Mucha, 2005). Clients have included Proctor & Gamble (Dias, 2006), Coca Cola (WFP, 2006) and MTV (Thompson, 2005), among many others.

However, despite the potential contributions NM can make, the authors think it is unlikely that it will revolutionise business as has been envisioned in popular press - the following section provides reasons for this.

#### **4. Discussion: Neuro-hype?**

Despite the claims supporting NM as well as the preliminary findings it has furnished, one must still put this neuroimaging technique into perspective and consider some of its limitations. To start, and as mentioned earlier, NM is based on the assumption that the brain is made up of discrete regions that control specific functions. However, recent research has determined that this is not as clear cut as previously believed, and that instead the brain operates as complex network processing information in an integrated manner. In the context of NM, this means that reactions to marketing stimuli can no longer be simplistically attributed to specific areas but are instead the product of complex brain-wide interactions currently beyond the present reach of NM. This also means that without any concrete brain regions to potentially influence, the concept and existence of NM becomes questionable. The reason why NM continues to be in the spotlight and increase in popularity is that most people (marketers included) do not really understand how the brain works and is structured, with their knowledge largely based on outdated information stemming from the 1970's or even earlier (Carmichael, 2004).

Another of the main arguments in favour of NM is that it successfully manages to tap into consumers' subconscious, where most emotions reside, and is able to induce preference and behaviour. While in principle this sounds reasonable, it is at best wishful thinking as the argument fails to acknowledge an important factor: Each consumer's subconscious is unique, probably more so than his/her conscious mind, and is instead a mysterious and volatile "black box", product of particular genetic endowment, life experiences, and thought processes. Neuromarketers are starting to realize this shortcoming as research increasingly shows that identical stimuli generated dramatically different brain activity among subjects (Mahoney, 2005). If reactions to stimuli are so varied and cannot be generalized across markets, then the usefulness of NM is further questionable.

A third factor that NM fails to consider is that the subconscious, and for that matter consumers, do not operate in a vacuum. Interpreting information, choices and behaviours are all carried out in an incredibly complex environment subject to a multitude of competing forces. All things equal, such as in carefully controlled laboratory conditions, NM might be able to explain how the brain reacts to certain stimuli and help marketers sway preferences. But in the real world, where personality, rational thought, social motivations and situational factors also determine consumer behaviour, the subconscious is but one variable, and probably an equally important one at best. Regardless of what advocates and detractors claim, NM is far from single-handedly controlling or even steering consumer preferences. NM is not even close to having found the alleged "buy button" in the brain. Given its lack of power, the usefulness of NM drops even further. And even neuromarketers themselves have realized this limitation. As Brockman (2006) indicates, neuromarketers are increasingly re-positioning their craft, downplaying it from "groundbreaking" and "sure-fire" to a "safeguard" to measure any possible disconnect between traditional research techniques and underlying subconscious motivations.

While lots has been said regarding the power of NM, both by supporters as well as by detractors, little is known about the exact nature of NM activity. Consultants and clients argue that activities have been purposely kept discreet,

first, to avoid that commercially sensitive information fall in the hands of competitors, and second, to avoid that the media, in their effort to sell stories, blow their research out of proportion and enrage the general public, government and other groups (Lee et al, 2007). The few pieces of empirical information that are available come from the popular press and may be traced back to practitioner comments. In general, the available information points towards a lack of rigor, unsound methodology and small unrepresentative sample sizes. This reduces NM's findings to mere claims, making them highly questionable. Furthermore, there is surprisingly little academic research published on specific NM areas, and even the effectiveness of NM as a whole. The fact that academia has not picked up on NM, be it through articles, conferences and even specialized journals, and that pioneers of the field, such as Zaltman, have already moved on to greener pastures might be an indication that NM is far from being what it claims to be and not worth while pursuing in earnest.

At the core of the matter are the entities making the claims regarding NM's power. Upon closer examination it's both NM consultants and consumer groups. In an effort to promote their respective interests, both of these feed NM information to the media, who in order to increase their ratings, cannot refuse a good story. In the case of consultants one would expect them to promote the power and importance of NM research with all their might. After all, it's their source of livelihood, and as things stand, big business. In the end, and regardless if NM works or not, consultants will capitalize on today's market's hypercompetitive nature and companies' eagerness to get ahead of rivals at almost any cost.

As far as consumer groups go, it seems they have embarked on a crusade against NM. Under the banner of saving social values, freedom of choice and even democracy itself from a Big Brother-style mind control, consumer groups are demanding Senate inquiries into the practice (Tiltman, 2005), lobbying Congress, and even threatening to bring on boycotts and class action suits against companies involved with this "manipulative" research (Nadkarni, 2006). However, and again putting things into perspective, NM is not any worse than other more acceptable market research techniques. Further, it does not come even close to the civil liberty abuses committed for example by the American Government in their alleged "fight against terror" and which these consumer groups should really be concerned about. It seems then that consumer groups have simply latched on to NM as a vehicle to legitimize their existence, operation and promote their interests. Nevertheless, this has also contributed to NM's hype, presenting it as extremely powerful.

## 5. Discussion: Fundamental Issues

So going back to the central question of this essay, will NM revolutionise business? While corporate clients might be easily seduced by scientific notions, hi-tech gadgets and colourful images of brain activity, and the general public alarmed by the notions of "buy buttons", "roboshoppers" and Big Brother style mind control, the authors are quite sceptical about NM's true effectiveness and believe that it is more hype than substance. Given the current lack of academic literature on NM, particularly empirical, coupled with the interests pushing the concept, NM's benefits are for now mere speculation.

Even though NM has proven capable of providing some insights, indeed contributing to market research, by no means is it able to stand on its own and replace conventional research methods. NM insights alone are still too basic for researchers to understand exactly what drives consumer behaviour. Because of this, traditional research methods such as focus groups or surveys are still critically important. At the most, NM should be seen as a complement that may be used to verify or enhance results obtained otherwise. But as NM becomes increasingly sophisticated thanks to technological developments, increased neurological understanding, and academic empirical support, it will be able to better address the complexities of preference, purchase decisions and consumer behaviour. Used together, both now and in the future, NM and traditional techniques should provide solid information against which marketers can make sound decisions.

On another note, NM's future development is also contingent on how far the scientific/academic community wants to even push the whole nature vs. nurture issue. By essentially reducing people's choices and behaviour to mere biological-physiological responses, perhaps genetically predisposed and influenced, NM lands right in the middle of this controversy. The scientific establishment has largely attributed human behaviour to environmental factors such as parental rearing (nurture) while innate biological/genetic factors (nature) have been mostly dismissed. The denial of human nature may be linked to three widespread and connected dogmas: Blank Slate (the mind lacks innate traits and dispositions), Ghost in the Machine (each person has a soul which makes decisions free from biological influence) and Noble Savage (the human soul is essentially good but corrupted by society). The reason for the scientific establishment denying human nature, which in turn affects the credibility of NM, are its potentially politically incorrect consequences, as discoveries might lead to unequal treatment of people, undesirable social change, absolve people from the responsibility of their choices and even reduce life's/religion's meaning and purpose (Pinker, 2002).

## 6. Conclusion

For NM to further develop it should continue to adopt a moderate position within the nature vs. nurture debate. NM might want to avoid taking any extreme position as cognition, emotion and the environment are all interdependent,

operating together, particularly in the context consumer behaviour. Instead of reducing the mind into independent components and betting on them in isolation, as NM has done until now, knowledge of these components needs to be synthesized back into a whole for a more holistic understanding of the mind. In addition, observations also need to be placed into context, as environmental impact is equally important in thought processes and their outcomes (Lazarus, 1999). As academic research on NM increases, not only will it provide further information on the workings of the mind, and its business applications, but perhaps even shed some light into the debate of human nature and the essence of man.

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International Journal of Business and Management

Publisher	The Publishing Center of IJBM
Address	67 Hudson Street Bayswater WA 6053, Australia
Phone	+61 8 9266 3699
Fax	+61 8 9266 2605
E-mail	editor@ijbm.net
Website	www.ijbm.net
Price	AUD\$9.00



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