



THE IMPLICATIONS OF NEUROMARKETING IN CONTEMPORARY MARKETING TECHNIQUES AND CONSUMER BEHAVIOUR

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Abstract : Neuromarketing is an emerging interdisciplinary field that combines neuroscience with marketing research to uncover insights into consumer behavior at the neural level. This article offers an academic examination of how neuromarketing techniques are applied in modern marketing practices and analyzes their implications for consumer decision-making. The study outlines the theoretical foundations of neuromarketing, including its methods for investigating consumers' subconscious responses. Key findings indicate that neuromarketing has significantly influenced areas such as advertising design, branding strategies, pricing tactics, and product development by revealing unspoken preferences and emotional reactions from consumers.

Key words : Neuromarketing; consumer behavior; neuromarketing techniques; neuroscience; subconscious responses; marketing research.

1. INTRODUCTION

Neuromarketing is a relatively new field, officially emerging in 2002 when Professor Ale Smidts coined the term "neuromarketing" [1]. Although the term itself seems suggestive enough, suggesting a combination of marketing and neuroscience, to properly define neuromarketing is a challenging task due to the various interpretations and perspectives associated with the term in question.

If we break down the core components of the term and analyze them particularly, traditionally, marketing can be defined as the activity aimed at creating a connection between products and consumers through the analysis and understanding of human behavior in the context of today's market. Regarding neuroscience, according to Plassmann (2012) [2], it can be defined as "the study of the nervous system aimed at understanding the biological basis of behavior"[3].

By synthesizing these two particular definitions, we can interpret neuromarketing as a field that aims to understand consumer behavior through the lens of unconscious processes. Lee (2007) defines neuromarketing as "the application of neuroscientific methods to analyze and understand human behavior in relation to markets and marketing exchanges"[4].

Neuromarketing can be considered a branch of neuroeconomics, which is itself a branch of neuroscience [3]. Thus, if we were to analyze neuromarketing as an integrated part of neuroscience, we can interpret it as a field of study that applies brain research methods to

better understand consumer behavior and implement these insights in marketing strategies.

At the same time, it is important to view neuromarketing as a field with a strong interdisciplinary character, due to the fact that this field has its origins in various academic domains. This interdisciplinary nature not only contributes to the complexity of the field but also provides a solid foundation for understanding consumer behavior through diverse perspectives. Neuromarketing's connection with psychology offers the ability to understand the fundamental processes behind consumer decision-making, their motivation, as well as emotions.

From an economic point of view, neuromarketing complements the classical value theory by highlighting variations in value perception and interpreting purchasing acts as financial losses. Simultaneously, sociological implications (such as social structures, consumption trends, and cultural factors) offer in-depth insights into the sociological profiles of consumers.

2. METHODOLOGY

This study is conducted as a qualitative research based on a thorough review of existing literature on neuromarketing. The approach involves synthesizing findings from various academic sources, including conference papers and graduation theses focused on integrating neuroscience with marketing. By examining a range of academic perspectives – from theoretical models to empirical case studies – the paper provides an



overview of the current state of neuromarketing and its practical implications.

2.1 Theoretical Framework and Analysis

Neuromarketing can be defined as the commercial use of neuroscientific tools—such as functional magnetic resonance imaging (fMRI), electroencephalography (EEG), and eye-tracking—to gain more reliable insights into consumer responses [5].

In essence, it seeks to uncover what consumers truly feel and think about marketing stimuli, even when those reactions occur at a subconscious level beyond the consumers' own awareness [5].

Researchers identify consumers' implicit emotional and cognitive reactions to advertisements, brands, and products by measuring physiological and neural signals [5]. For example, changes in brain activity can reveal a viewer's engagement or emotional arousal when exposed to a television commercial, offering a window into consumer preferences that traditional self-report methods might miss.

2.2 Neuromarketing Technologies:

A variety of technologies drawn from neuroscience and psychology are employed in neuromarketing studies to capture these hidden responses. Common neuromarketing techniques include neuroimaging methods like fMRI, which detects changes in blood flow in the brain to infer neural activation, and EEG, which records electrical brain waves in real time [6].

Other tools, such as eye-tracking cameras, monitor where and how long a person focuses on different elements of a visual ad or webpage; facial coding software analyzes micro-expressions for emotional cues; and biometric sensors measure arousal through galvanic skin response or heart rate. Table 1 provides an overview of several key neuromarketing tools and their uses in capturing consumer reactions.

Table 1. Neuromarketing Techniques and Their Uses

Technique	Description	Application example
EEG (Electroencephalography)	Records electrical activity of the brain with high temporal resolution, showing patterns of brainwaves (e.g., alpha,	Testing real-time reactions to advertisements or identifying moments of peak engagement during a TV

	beta) in response to stimuli.	commercial.
fMRI (Functional Magnetic Resonance Imaging)	Measures changes in blood flow in the brain (via the BOLD signal) to map which regions are activated by certain stimuli.	Discovering which parts of a print advertisement draw attention first, or how a shopper scans a product display.
Eye-Tracking	Tracks eye movements and fixations to reveal where visual attention is directed on an ad, package, or webpage.	Discovering which parts of a print advertisement draw attention first, or how a shopper scans a product display.
GSR & Pupillometry	Galvanic skin response (measures skin conductance) and pupil dilation tracking, both indicators of physiological arousal or interest.	Assessing a viewer's emotional arousal during a movie trailer, or noting increased pupil size when a consumer sees a preferred option.
MEG (Magnetoencephalography)	Detects magnetic fields produced by neural activity, offering millisecond-level timing (like EEG) with improved spatial localization.	Researching the precise timing of brain responses to marketing stimuli (e.g., a neural reaction to a short subliminal message).

By applying these techniques, neuromarketing research can delve into the subconscious drivers of behavior that classical marketing models often treat as a "black box." Decades ago, marketing theorists acknowledged a gap in understanding what happens in consumers' minds between the marketing stimulus and the resulting purchase decision. Neuromarketing helps



fill this gap by directly observing neural correlates of attention, emotion, and decision-making [3]. This approach aligns with findings in cognitive psychology and behavioral economics which show that context, emotions, and automatic processes (i.e., the brain's fast "System 1" thinking) dominate much of consumer decision-making [5]. Kahneman's dual-system theory, for instance, suggests that intuitive and emotional judgments often guide consumer choices before rational deliberation ("System 2") comes into play [7]. Neuromarketing techniques, by capturing instinctive brain responses within milliseconds, essentially tap into the System 1 processes underlying consumer preferences. As illustrated in Table 1, an EEG readout of a consumer viewing an advertisement might show spikes in certain brainwave frequencies that correspond to heightened attention or emotional engagement at specific moments in the ad (e.g., during a dramatic scene or when a brand logo appears).

3. RESULTS AND DISCUSSIONS

The application of neuromarketing techniques in real-world marketing has yielded insights that directly inform strategy and tactics. In advertising, for example, neuromarketing studies help identify which elements of a commercial or print ad evoke the strongest neural and emotional responses, allowing creatives to optimize content [8]. One famous neuromarketing experiment used fMRI brain scans to compare consumer preferences for Coca-Cola vs. Pepsi [5]. When participants tasted the drinks without brand information, a majority preferred Pepsi. However, when they knew which brand they were tasting, many reported preferring Coca-Cola – and the brain scans revealed a substantially higher activation in emotional memory centers for Coke, driven by its powerful brand image [5]. This finding demonstrated how brand associations can actually overwrite taste preferences at the neural level, confirming the profound influence of branding on consumer experience.

Neuromarketing has likewise been employed to refine product design and packaging. By observing neural reactions to different package designs or product concepts, firms can choose the options that elicit the most positive subconscious response. Frito-Lay, for instance, worked with a neuroconsultancy to test consumer brain responses to various potato chip package designs [9].

The research indicated that glossy, image-laden bags triggered guilt-related brain responses in female consumers, whereas matte packaging with subtle visuals did not. This insight led the company to introduce new packaging that appealed more to their target market, contributing to increased sales [1].

In another case, automotive company Hyundai used EEG-based neuromarketing tests with a sample of

consumers to develop a new car prototype; participants' brainwave feedback guided design adjustments that ultimately made the car more appealing [10], [11]. These examples illustrate how neuromarketing allows for data-driven tweaks to marketing elements that traditionally would rely on intuition or self-reported preferences.

Beyond individual case studies, broader marketing domains have been impacted by neuromarketing findings. Research indicates that neuromarketing can significantly influence marketing's core "four P's": product, price, place (distribution), and promotion. Neuroscientific insights have been used to fine-tune pricing strategies (for example, identifying pricing formats that the brain perceives as more attractive or fair), to optimize store layouts and product placements in retail environments, and to shape branding strategies that resonate emotionally with consumers [1], [3].

In terms of promotion, advertisements designed with neuromarketing input often aim to tell stories or use imagery that activates desired brain regions associated with pleasure, trust, or memory. Branding efforts, similarly, focus on building sensory and emotional associations (sound, color, imagery) that reinforce brand identity at a subconscious level.

As neuromarketing knowledge permeates the industry, even marketers who do not have direct access to fMRI machines or EEG labs are adopting its lessons. Seemingly minor design choices—such as the color scheme of a website or product packaging—are now recognized as having outsized effects on consumer perception and are often informed by psychological research [1]. Colors can evoke specific emotions and associations: for example, using shades of blue in a logo or store décor can foster feelings of trust and stability, while black or gold can connote luxury [1]. Similarly, the placement of visual elements follows principles gleaned from eye-tracking studies; for instance, important messages or call-to-action buttons are positioned where viewers' eyes naturally travel. Despite these promising applications, the rise of neuromarketing has been met with considerable scrutiny regarding ethics and consumer welfare.

Observers have raised concerns that neuromarketing could be used to manipulate consumers at a neurological level, effectively finding a "buy button" in the brain that, if pressed, would compel people to purchase involuntarily [5], [6]. Such fears, while exaggerated, underscore the importance of transparency and consent in any research that scans brain activity for commercial purposes.

In reality, neuromarketing does not confer mind control—consumers still exercise free will—but it does provide marketers with more effective means of persuasion, which must be handled responsibly.

Some early claims around neuromarketing's power proved to be hype, and researchers caution against



misconceptions. For instance, the idea of a single neural trigger that guarantees a sale is a myth [5], and reputable neuromarketing studies focus on probabilistic increases in effectiveness rather than absolute guarantees of consumer behavior change. To address ethical concerns, industry organizations and scholars have begun developing guidelines for the responsible use of neuromarketing. There is a growing consensus that consumers' privacy and autonomy should be respected – for example, brain data should not be collected without informed consent, and interpretations of neural signals should be handled with care to avoid overreach. The Neuromarketing Science and Business Association (NMSBA) has even introduced a code of ethics, and academic discussions have proposed globally applicable ethical standards for neuromarketing research [3].

If such standards are rigorously applied, they can mitigate the risk of neuromarketing being used in manipulative or harmful ways [3]. Indeed, when conducted ethically, neuromarketing research can be seen as a tool to better satisfy consumer needs – for example, by avoiding advertisements that consumers subconsciously find distressing, or by designing products that genuinely delight users. Thus, the implication for consumer behavior is twofold: marketers gain deeper insight into how to influence choices, but they also carry a greater responsibility to align those influences with consumers' true well-being.

4. CONCLUSIONS

In summary, neuromarketing represents a significant advance in the toolkit of marketing research, illuminating the hidden layer of consumer cognition and emotion that traditional methods often cannot reach. The implications for contemporary marketing techniques are substantial: campaigns and product designs can be iteratively improved based on neural feedback, leading to marketing strategies that are not only more effective but also more attuned to genuine consumer preferences.

The influence of neuromarketing on consumer behavior is most evident in its confirmation of a long-held suspicion in marketing: much of consumer decision-making happens beyond conscious awareness. Neuromarketing provides concrete, empirical support for this idea, showing that factors like brand familiarity, emotional resonance, and sensory cues can sway consumers on an unconscious level [5].

Acknowledging this reality has encouraged marketers to craft experiences that connect with consumers more authentically – for instance, by storytelling that evokes emotion rather than relying on rational arguments alone. At the same time, this knowledge places greater ethical demands on marketers to avoid exploiting vulnerabilities in the consumer psyche.

As an evolving interdisciplinary field, neuromarketing still faces challenges, including technical limitations, the need for more standardized methodologies, and ongoing skepticism from both the public and some academics. Yet, its trajectory points toward growing integration with mainstream marketing. Continued research and technological progress (such as more portable brain-scanning devices or advanced AI for data analysis) are likely to make neuromarketing insights even more accessible and actionable in the near future.

Ultimately, when applied judiciously, neuromarketing has the potential to create more effective marketing campaigns and better products – innovations that benefit businesses and consumers alike – while also

deepening our scientific understanding of how and why people make the choices they do.

As we look ahead, the synergy of neuroscience and marketing may well become a cornerstone of consumer research, enabling a future in which marketing not only sells more effectively, but also resonates more meaningfully with the human brain and heart.

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