

Application of Neuroscience in Neuromarketing

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Abstract:

The key challenge marketers' face today is high competition and advertising clutter. In each and every market, consumers have a lot of choice when it comes to products and services. Similarly, too many advertisements across traditional channels (e.g. Print, TV, Radio, Billboards) and digital channels (e.g. Internet, Social Media, Mobile) are at times irritating and confusing to the consumers. In this context, companies are increasingly exploring ways and means to catch the attention of the consumers and retain their attention span, to increase the sales conversion rate for their products and services. Companies are investing significant time and effort to understand neuroscience, to study the consumer mind and how it influences their buying decision and behaviour. Neuromarketing involves application of neuroscience technology and techniques to the world of marketing. The main objective of Neuromarketing is to capture the five senses of the consumer towards their brand, advertisements, products and services. The purpose of Neuromarketing is to create memorable experiences for the consumers or customers, which increases the probability of their purchase (in the short term) and their loyalty (in the long run). This paper focuses on the application of Neuroscience in Neuromarketing, in terms of the concept, applications, technology, benefits, limitations and future trends. This is a practitioner's view, shared based on my experience in the industry and learning from academics.

Keywords: Neuromarketing, Neuroscience, Advertising, Consumer Behaviour

Neuroscience and its applications – An Overview:

In simple terms, Neuroscience is the scientific study of the human nervous system. Eric R. Kandel, Nobel Laureate in Physiology or Medicine emphasizes that the "ultimate challenge" of the biological sciences, is the understanding of the biological basis of learning, memory, behavior, perception and consciousness, in human beings (Sharma, Singh, Deepak, & Agrawal, 2010).

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As neuroscience deals with the study of how brain works, the primary applications were focused on healthcare, especially in the diagnosis and treatment of neurological and psychiatric diseases.

Beyond healthcare, neuroscience has been extensively adapted in education, business, advertising and marketing, as neuroscientific research gives us insights into human behavior (West, 2009).

Applications of Neuroscience		
Healthcare	Neurology, Neuropsychology, Clinical Neuroscience	Study and treatment of neuro ailments (e.g. Alzheimer's, Parkinson's, Depression, Bipolar Disorder, Schizophrenia)
Education (Lynch, 2017)	Neuroeducation, Neuro-Linguistic Programming	Understanding childhood development Develop innovative learning methods Support children with learning difficulties (e.g. Autism, Dyslexia)
Business (Nelson, 2016; Shaw, 2015)	Cognitive and Behavioral Neuroscience, Computational Neuroscience	Building better Leaders Creating better working environment for employees Nurture creativity and innovation Better customer engagement

Marketing (Humphrey, 2017; Klineckova, 2016)	Neuromarketing, Cognitive and Consumer Neuroscience	Understanding consumer buying behavior Study of consumer decision process Marketing campaigns to capture the 5 senses of the consumers Emotional appeal in advertisements Customer sentiment analysis
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What is Neuromarketing? - Concept, Need and Benefits:

Neuromarketing is the application of neuroscience to marketing. In Neuromarketing, companies use neuroscience techniques like brain activity measurement to measure a consumer's behavior and response towards external stimuli like advertisements, products, services, packaging, promotions, campaigns, offers and other sales and marketing initiatives and hence their buying decision. Understanding customer perceived value and consumer behavior helps companies to make their advertisements, products, services, packaging, promotions, campaigns and offers attractive to the consumers, to meet their tastes and preferences, which ultimately makes their sales and marketing initiatives productive and successful. In-depth understanding of consumers enables companies to market/sell their products and services in a better way (Humphrey, 2017; Sharma, Singh, Deepak, & Agrawal, 2010). Applying neuroscience techniques in Neuromarketing will augment the traditional marketing research techniques like survey, focus groups and personal interviews; for studying consumer tastes, preferences and hence, their behavior (Netty & Yazdanifard, 2013).

Neuromarketing to address the key challenges in marketing:

The key challenges that marketers' face today are competition and advertising clutter. The consumers have a lot of choice when it comes to products and services in each and every market. Similarly, too many advertisements across traditional channels (e.g. Print, TV, Radio, Billboards)

and digital channels (e.g. Social Media, Mobile) are at times irritating and confusing to the consumers. So, increasingly, companies are exploring ways and means to catch the attention of the consumers and retain their attention span, to increase the conversion rate for their products and services (Humphrey, 2017; Shaw, 2015). One approach to overcome this challenge is the study of consumer neuroscience and consumer behavior. Based on this, we can apply Neuromarketing to capture five senses of the consumer towards their advertisements, products and services. The objective is to create a memorable customer experience, which increases the probability of purchase (in the short term) and customer loyalty (in the long run). In traditional marketing, techniques like survey are used to know and understand the tastes and preferences of customers. In Neuromarketing, techniques like EEG, fMRI, CT Scan, Eye Tracking, and Facial Coding, to name a few, are used to study the human brain, in an attempt to understand customer attention and perception towards advertisements, products and services. Even study of response of right brain (focused on logic, facts) vs. left brain (focused on emotion, art, creativity) helps advertisers to design impressive ad campaigns, to capture the attention of customers (Netty & Yazdanifard, 2013; McCartan, 2012).

Impact of different types of advertisements on Consumers:

Application of neuroscience in the study of consumer behavior is referred to as consumer neuroscience. For example, while viewing an advertisement video (external stimuli), the consumer goes through different stages of responsiveness, based on the type of the theme and the audio-visual impact it has on them. The overall experience of consumers, say in a retail store or in viewing an advertisement, impacts their buying decision. When the consumer sees a rational advertisement, it provides them required information about the product or service, which helps the brain to take a decision using logic and reasoning (e.g. Ads related to Laptops and Smart Phones). On the other hand, an emotional advertisement is targeted at capturing the viewers' (potential customers) heart, with a small storyline related to family or friends (e.g. Samsung Bixby Voice Assistant Ad). Similarly, how customers react to TV advertisements and programs is measured over a period of time, across time zones, target groups and locations, then analyzed to observe any specific patterns. Based on this analysis and findings, the existing advertisements are repositioned or new advertisements are created, so as to capture and retain the customer attention and influence their buying behaviour.

Applications and Examples of Neuromarketing:

Today, we see application of Neuromarketing across different industries. We will have a look at a few of them in this section, to appreciate its significance.

- **Multiplex Cinema Halls (e.g. PVR Cinemas, Cinepolis):** Multiplex Cinema Halls use all ways and means to capture the five senses of their customers. The movie has attractive lighting and picture (eyes), excellent sound effects (ears), offers snacks like popcorn and other eatables (smell and taste), and texture of seats and sofas (touch and feel), which collectively captures the five senses of the customers. When the customer experience is good, they wish to come repeatedly to the multiplex cinema hall with their family and friends, which results in increased customer loyalty and revenues. Display of ads of food items like popcorn, during movie interval, creates appetite and makes customers buy them; this is also a good example of Neuromarketing.
- **Retail Stores (e.g. Big Bazaar, Shoppers Stop):** In a retail store, customer's mood, profile, tastes and preferences, likes and dislikes, highly impact the way they move around the store (across different floors they visit), products they see (based on brand, price, packaging) and hence their buying decision and pattern. Right from entry to exit, retail stores are trying to make the customer journey really exciting for them. When a customer is welcomed and supported throughout their presence in the retail store, it's a feel good factor. Similarly, the retail store's ambience, lighting, background music, food samples, cloth trial rooms, and courteous store representatives, all make the customer's journey in a retail store exciting. When customers spend more time in the retail store, they examine a greater variety of products, often resulting in an increased purchasing from the customer side. When customers are consistently happy with their visits to the retail store, they become customer advocates and share their good experience (positive feedback) with their family and friends (through word-of-mouth), which progressively increases the foot-fall to the retail stores and its business growth.
- **Hotels, Restaurants and Coffee Shops (e.g. Taj Hotels, Starbucks):** Customer experience is the core vision and mission of the hospitality industry. Hotels, restaurants and coffee shops are investing a lot of time and effort to understand the customer expectations and preferences

and go all the way out to apply Neuromarketing to capture their senses (through ambience, good/tasty food, appropriate pricing) which makes their overall experience memorable.

Right Brain vs. Left Brain – Impacting Advertisement Design:

In human beings, images are processed by the right brain and text is processed by the left brain (McCartan, 2012). What the right eye sees is transferred and processed by left brain and what the left eye sees is transferred and processed by the right brain. This is why in advertisement design (e.g. display ads and banners in print and digital) images are placed on the left and text is placed on the right. This is another good example of applying neuroscience in Neuromarketing.

Emotional Advertisements (e.g. Samsung Bixby, NanhiKali):

Emotional advertisements have always been known to capture customer attention, towards a company's products and services (Dooley, 2009). One of the recent emotional advertisements is Samsung's ad for Bixby Voice Assistant. This campaign is inspired by a real-life story showcasing the use of technology in helping a daughter preserve her mother's voice as she has Motor Neuron Disease (MND) which slowly takes away a person's ability to speak and move. Another example of an emotional ad is the NanhiKali Project, which launched initiative #EducateTheGirlChild, with a heart touching ad campaign with a very strong message about educating the girl child. It shows a little girl cutting her hair and wearing the school uniform of her brother. When enquired about it by her friend, she says that she wants to look like a boy so that she can continue studying in her school. Both these emotional ad campaigns were well received in terms of the content and went viral in the social media.

- **Consumer Generated Content (e.g. Starbucks, Apple):** In Neuromarketing, advertisements are focusing on 'story-telling' and 'story-making', to capture customer attention and increase their involvement in the marketing campaigns. Story making is driven by consumer generated content. One of the well known examples is the 'Shot on iPhone' campaign, where iPhone customers shoot fascinating photographs on their iPhone and share it with Apple. Apple selects the best photo shots and places them as big billboards, mentioning the name of the customer, who shot the photograph.

This captures customer attention, as it depicts the power of iPhone and the simplicity with which the customers can capture the pictures. Another example is the Starbucks' famous #WhiteCupContest. Starbucks asked its customers to get creative and doodle their best designs on their white paper cups, where the best entry would form a template for new limited-edition coffee cups to hit Starbucks' stores. These are good examples of Neuromarketing, to bring customers closer to a brand.

- **Web Portals and Mobile Apps UI/UX Design (e.g. Amazon, App Store):** When a web portal or mobile app (e.g. Amazon eCommerce, Apple iOS Mobile Apps) is impressive, interactive and user-friendly, the customer engagement increases, which ultimately leads to Conversion Rate Optimization (CRO). Marketers and UI/UX Designers are extensively employing neuroscience in the design and development of web portals and mobile apps, to make it attractive to their customers, to capture their attention. Techniques like A/B Testing is applied for CRO, by exposing customers to different web and mobile content designs (e.g. Colours, Text, Pictures, Features, Form, Functionality) and identifying their preference and continuously updating the design in terms of look and feel, to enhance overall customer experience. Similarly, a detailed study of Customer Journey Mapping on an ecommerce website (e.g. Amazon) helps the company to fine tune different features and functions on the web portal and mobile apps, to make it user-friendly and contribute to CRO, hence business growth.

Psychological Pricing (e.g. Bata, iPhone):

As consumers, we see extensive use of psychological pricing (e.g. Bata Shoe Price at Rs.799, instead of Rs.800; iPhone Price at \$999, instead of \$1000) has a huge impact on consumer behavior and buying pattern. Psychological pricing is a good example of Neuromarketing where prices of products or services are made to look cost effective, from the customer's emotional point of view, thereby contributing to increase in sales of these products and services (Anastasia, 2015).

Testing products/packaging/flavors before launch (e.g. Tea, Wine, Pizza, Snacks):

FMCG companies invest significant time and effort in testing new products for their packaging and flavor, by a sample group of consumers, by observing

their response and by taking their feedback and suggestions. Apart from collecting direct feedback, companies use techniques like EEG (to observe brain response) and Facial Coding (to monitor facial expression), to measure the consumer response to the product pricing, packaging, colors, shapes, taste, flavors. This enables them to design/redesign their offerings, to suit consumer tastes and preferences.

Adaptation of Global brands/products to Indian Markets (e.g. McDonald's, Nestlé):

Preferences of Indian customers, especially when it comes to food products, differ compared to global customers. Companies like Nestlé (e.g. Maggie) and McDonald's (e.g. McVeggie) have customized their global brands/products (in terms of product name, packaging, flavor) to suit the Indian Market. Even within India, the taste and preferences of rural and urban markets vary. In rural markets, the product purchase usually depends on the advertisements and packaging (e.g. colour, text, image) more than taste; while in urban market, the purchase decision depends more on the company/brand/loyalty factors (Dutta & Mandal, 2019).

Neuroscience Technology and techniques used in Neuromarketing:

Different neuroscience/neuroimaging techniques applied in Neuromarketing to study consumer brain, facial expression, eye movements and other parameters, in response to advertisements, products and services are listed and briefly described below:

EEG (Electroencephalography):

EEG is used to monitor and measure brain activity, by placing electrodes in the head, in response to external marketing stimuli like advertisements, product packaging, taste and flavors (Khushaba, et al., 2013).

fMRI (Functional Magnetic Resonance Imaging):

MRI measures the blood-oxygenation-level dependent, using hemoglobin's magnetic properties. fMRI can be used to monitor the brain's function in response to marketing inputs like different advertisements, brands, product packaging, taste/smell of products, by placing the consumer (volunteer for marketing research) in the MRI scanner (Khushaba, et al., 2013; Loijens, n.d.).

Eye tracking and Heat Maps:

Eye tracking (using wearable eye trackers) is extensively used to observe the consumers' vision when they visit a retail store, to study their behaviour from entry to exit, in terms of which section they visit, which racks and products catches their attention. The eye tracking observations are visually represented in the form of heat maps, with different colours like red, orange, yellow, green, representing different levels/intensity of consumer viewing. Similarly, eye tracking is also used to observe the customer's views on web pages and digital advertisements on computers and mobile devices. Study and analysis of customer eye tracking gives a lot of insights to marketers in terms of positioning their products in a retail store or in positioning a digital ad, to ensure maximum attention, hence influence their buying decision (Schaik, 2013; Jones, Gillespie, & Libert, 2019).

Facial Coding:

Here, the consumer is exposed to specific advertisements or different advertisements and their facial expressions are recorded continuously and then analyzed to see their emotion and reaction to different parts of the advertisement or different advertisements. This study is first conducted on a target consumer base, with the required sample size, and then their responses are analyzed. This analysis will help companies and ad firms to fine tune or redesign their existing ads or create new ads in line with the tastes and preferences of the target consumers (Schaik, 2013).

Galvanic Skin Response (GSR):

GSR (also referred to as Electrodermal Response) techniques are employed by marketers to measure the consumer's response to new products (like skin care products), by measuring the change in the skin's electrical resistance. EEG can be combined with GSR to measure the consumer experience, by exposing them to the advertisement of a new skin care product (to monitor the brain response) and simultaneously applying the skin care product (to measure the physical response).

AR/VR (Augmented Reality / Virtual Reality):

Retail stores are doing extensive research in consumer behavior, by selecting volunteers amongst customers and providing them with AR/VR goggles, which they wear and move around the stores(physical or virtual), from entry to exit. The AR/VR goggles continuously transmits detail data on customer movement, what and where they see, what products they pick up, how they interact with support staff in the stores, etc. Alternatively, they also monitor

customer movements and preferences through the CCTV cameras, which help them to generate heat maps on the most crowded locations, most viewed products etc., within the retail stores. AR/VR is also used in retail to give a virtual and augmented reality based 360 Degree shopping experience to customers.

In practice, a combination of these neuroscience technologies and techniques are applied in Neuromarketing to measure and monitor the consumer's response to external stimuli like advertisements, brands, products and services.

Neuromarketing by Major Companies – Few Examples:

Some of the major companies which employ Neuromarketing are mentioned below:

- IBM – Watson applies Natural Language Processing (NLP) techniques to learn consumer tastes and preferences.
- Samsung – Bixby Voice Assistant, emotional video ads on TV and YouTube.
- Coke – Consumer generated ad content through “Share a Coke” campaign.
- Maggi – Comeback campaign, through 60 second nostalgic story videos.
- Daimler – Car design based on neuro study of customer tastes and preferences.
- PVR Cinemas – Design of different cinema formats like IMAX, 4DX, Play House, Gold, created based on customer preferences.
- CavinKare – Introduced sachet shampoo (e.g. Chick Shampoo), with low cost, but high utility in the rural market, where it saw a huge business potential.
- Microsoft – Uses eye tracking, to learn about customer interactions with computers, in terms of understanding their preferences and feelings (satisfaction or dissatisfaction).
- Google - Employs techniques to read our brain, to understand the response to digital ads and helps companies to customize their digital marketing campaigns accordingly.

- Harvard Business Review (HBR) - HBR sends an email request to its Advisory Council members to help them select a cover design for the next issue of Harvard Business Review, through an online survey.

Globally there are several marketing and advertising firms offering Neuromarketing services to the leading corporate, across different industries like Retail, Banking, Telecom, FMCG, Manufacturing, Automobiles, to survive and sustain in the competitive environment. These companies offer Neuromarketing consulting and market research services, by employing state-of-the-art neuroscience techniques to study and analyse consumer behaviour, recommend different branding, advertisement and product/service positioning and differentiation strategies, to their client organizations.

Limitations and Concerns about Neuromarketing:

Practically applying neuroscience imaging techniques to read customers mind (e.g. EEG, CT Scan, fMRI) involves significant time, effort and cost (Loijens, n.d.).

Some of these technologies are relatively older and may not assure optimum accuracy, in terms of interpretation of results of study of human brain and its impact on consumer behaviour.

We have exponential change in technology and progressive change in consumer behaviour with different generations (say Gen X, Y, Z) and marketers cannot be complacent or static with their Neuromarketing initiatives. This needs to evolve on a continuous basis, with a dedicated team and focused efforts.

There have been ethical concerns expressed on exposing customers to Neuromarketing, by application of neuroscience brain imaging techniques, with regard to privacy and health.

While Neuromarketing can be used to sell a good product or service, it should not be misused to sell an inferior product or service, by just influencing the consumer's mind (Swathi, 2018).

Children getting exposed to Neuromarketing research are also a matter of concern. Similarly, neuro research for commercial purpose is also being criticized.

Future of Neuromarketing:

Neuromarketing is evolving and needs to mature over the coming years, to address all these limitations. Further research in Neuromarketing, especially in applying neuroscience techniques in understanding consumer mind and behaviour will enable us to create more success stories on the application and benefits of Neuromarketing, which will further strengthen its adaptation. Marketers will work more closely with neurologists, for further research and development, in the area of Neuromarketing and consumer neuroscience. In the future, Neuromarketing might be extended to Nanomarketing. Nanomarketing plans to integrate Neuromarketing tools in small, non-intrusive and wireless devices. Nanomarketing technology enables measurement of customer's emotional states in real time (Netty & Yazdanifard, 2013).

Conclusion:

Business is driven by customers; marketing advertisements and campaigns play a significant role in a company's brand recall and in sale of its products and services. Understanding the customer's mind and their tastes and preferences, helps an organization to design their offerings, right from advertisements (say ads in Newspaper, TV, Social Media, Billboards), product and service design, retail store design, eCommerce web portal, mobile app and all the customer touch points to capture and retain their attention. The focus of Neuromarketing is to create an excellent and memorable customer experience, across all touch points, which contribute to increased conversion rate, sales and business growth. Neuromarketing involves working tirelessly in understanding consumer behaviour, their tastes and preferences, by applying learning from neuroscience research and techniques, involving study of human brain. Significant amount of research and investments will go into Neuromarketing to create and offer innovative marketing campaigns, excellent customer experience, and product/service differentiation, to stay ahead of competition and to increase customer loyalty and lifetime value.

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