

Decoding Neurotic Stimulations Via Application of Neuromarketing & Bio-Imaging Techniques

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Abstract

Medical practitioners have been trying hard to decode neurotic stimulations in human brains after being exposed to certain non-biological stimuli. The instigation of these neurons cascades a series of chemical reactions that trigger emotions & mould psychology in consumer-centric biological patterns. These patterns are of utility to marketers as well. Marketers have advocated the inclusion of consumer psychology and the instigation of emotions for accentuating purchase intent. This consumer behaviour-based approach of luring the customers and subsequently slating them in the direction of positive consumer decision-making has gained paramount significance in the bio-imaging assisted marketing current scenario. However, the contemporary competitive weapon named neuromarketing augments the implementation and evaluation of consumer- behaviour-centric marketing approaches with scientific and biological backup. These psycho-physiological changes can yield insight into the hidden mechanism behind consumer decision-making. Neuromarketing is a tool that holds promise to discern these neuron-mediated psycho-physiological changes through various techniques like EEG, fMRI, skin conductance etc. This conceptual paper employs exploratory research design to create a nexus between bio-imaging techniques & tools of neuromarketing so that the marketing efforts put in by organizations get a scientific justification. Conceptual framework analysis based on points of parity observed in the filtered literature has been qualitatively used to draw inferences. The paper heralds promise not only to the neuro-scientists, product designers and point-of-purchase administrators but also to the marketers who are collectively craving for rapid implementation of neuromarketing so that maximum mileage can be drawn by the business organizations who are putting enormous inputs in reaching the consumer minds.

1. Research Objective

To create a nexus between neurotic stimulations via the application of techniques of neuromarketing & bio-imaging so that the marketing efforts put in by the organizations get a scientific backup.

2. Introduction

The core interest areas of marketing are based on consumer decision making which rests on the central pillars of psychology & perception because

the psychological aspects of humans trigger specific emotions. Psychologically provoked emotions can be scientifically traced via techniques of neuromarketing which study brain activities pertaining to time, frequency and space in reference to neuronal activities. The application of neuromarketing can help decode the human brain better and unravel the insights and emotions of individuals. Neuromarketing has been defined as that mix of neurosciences and marketing that aims at understanding and analysing human behaviour in

context with marketing interventions. The psychological underpinnings are innate to the intrinsic world of the human mind and act as a vital dimension to dictate human behaviour including consumer behaviour (Dibb et al. 1995). It is a synergy of senses that orchestrate the decision making of an individual (Vodopija and Felici, 2009). This synergy of senses driven by emotions trigger a psychological chain reaction in human mind which can be scientifically discerned by techniques of neuromarketing. The psychologically driven emotion triggers manifest neuron based psycho-physiological effects on human beings. These manifestations can be detected by neuromarketing in favour of both marketers and consumers. Neuromarketing holds immense potential for exposing the 'hidden information' in consumer minds thereby making it a technique of choice for marketers. Due to a subjective approach to market values, standard field research often becomes victim of prejudice thereby distorting the accuracy of results. Brain scanning techniques (employed by neuromarketing) detect the slightest of neuronal activity orchestrated by human psychology and past brand experiences with accuracy. Establishing a nexus between psychology, brain activity, neuroscience and expressed preference for brands is pivotal to marketing as this nexus can unearth the underlying purchase intentions. The dual approach to neuromarketing could lead to a win-win situation for both marketers and buyers & help understand the reason for a preferred product purchase (Wilson et al., 2008). The psychology-oriented applications of neuromarketing bi-focally emphasizes on consumer behaviour and brands equally. The cognitive process that drives a purchase decision is complex and involves engagement of neuron-based brain activity interventions (Ariely and Berns, 2010). These cognitive processes rests on myriad of human based factors like consumer traits, buyer's characteristics, human emotions, gender differences, age gap, psychology & human brain functioning, psychological appraisal and processing of advertising communication appeals as discerned in this research paper. This conceptual paper aims at exploring the above-mentioned factors and how the application of neuromarketing can unveil the psychological aspects that drive consumer decision making by evoking affective emotions.

3. Literature Review

3.1 Amalgamating Psychology with Neuromarketing

Psychology especially in context to consumers is centred on:

- (i) emotions
- (ii) feelings
- (iii) perceptions
- (iv) sentiments

that consumers develop for products that they purchase or intend to purchase. These feelings, in turn, have a profound impact on consumer behaviour in the market arena (Penz and Hogg, 2011). The impact created on sensory organs of the consumers generate awareness about the brains and this impact can be gauged via Neuromarketing which can help us understand this phenomenon (Kumar and Singh, 2015). The techniques of Neuromarketing can help the researchers in discerning the changes in consumer behaviour and further decode the portions of brain influencing consumer decision making. Neuromarketing includes brain scanning, mapping and imaging in order to analyse consumer response to various marketing stimuli & marketing mix (Cherubino et al., 2019). Understanding the science and psychology behind consumer behaviour by scientifically studying the psycho-physiological changes in human brain & body is the main intention of Neuromarketing. Triggering of human emotions and the unconscious mind can be traced via psychological studies. Neuromarketing better steers the business organisations in discerning the consumer behaviour by mapping these manifestations of unconscious mind and emotions to orchestrate a purchase decision (Sebastian, 2014). It has been established in research studies that in order to evoke brand loyalty among consumers it is imperative for business firms to conceptualize the emotions and feelings of consumers (Constantinescu et al., 2019). Psychological studies pertaining to consumer behaviour depict positive and negative notions associated with the feelings and emotions of consumers (Williams, 2014). It is the consumer

psychology that directs the brain to take a decision. Even in online shopping, it has been ascertained that it is the consumer psychology that triggers a purchase decision (Rahman et al., 2018). It is a human – centric activity that propels consumers to transcribe their emotions through physiological interventions (Mattelmaki et al., 2013). Even colour psychology has been found pivotal to decision making by evoking feelings that signal the brain to act in a certain way (Macedo, 2020). All such feelings and emotions have a certain psycho-physiological bearing that can be scientifically justified via Neuromarketing.

3.2 Tracing of Emotions using Neuromarketing Techniques

Preference for specific products and particular brands can be clearly indicated by tracing the emotional arousal of consumers (Reimann et al., 2012; Gaczek, 2015). This emotional arousal can be fathomed by measuring the electro-dermal activity. Favourite branded products elicit better emotional arousal in contrast to non- branded products with reference to children (Smith et al., 2019). Studies have also quoted variations in emotional responses with respect to previously established relationships vis-a-vis a newly formed brand association (Reimann et al. 2012). Few studies conducted on electro dermal activity studied on respondents claim brand to be as good elicitors

of emotional arousal as close peers and may demonstrate a remarkably better impact than even interpersonal associations (Langner et al., 2015). Emotional arousal as a proxy to skin conductance can be physiologically correlated to the electro-dermal activity (Bradley and Lang, 2000). Electro-Dermal Activity (EDA) can assist in drafting a conceptual construct of emotional arousal which, in turn, can establish EDA as a better indicator of consumer behaviour over its emotional counterpart (Coker, 2020; Szymkowiak et al., 2020). It is therefore vital for researchers to not only restrict oneself to study of brand communication but also consider measuring the degree of consumer arousal or excitement via techniques of Neuromarketing (Urszula et al., 2021).

3.3 Electro Encephalograph (EEG) as a tool of Neuromarketing

Based on the right-left asymmetry observed in frontal EEG signals, the electro-physiological responses denote positive and negative emotional experiences. These responses enable recording of immediate feedback (as a reaction to stimuli) manifested in the form of series of fluctuations observable through the frequencies of brain signal transmission (Brown et al., 2012). As per Davidson et al in the year 1990, the same has been indicated in Table 1.

Table 1: EEG Activity and associated indications of emotions

S. No.	Type of EEG Activity	Kind of Processing	Observable Indications
1	Relatively greater left-frontal temporal activity.	Processing of positive effects.	Amusement, Joy, Happiness.
2	Relatively greater right-frontal temporal activity.	Processing of negative effects.	Disgust, Dissatisfaction.

On being exposed to advertisements, consumers often develop a preference for products almost instantaneously (Wei et al., 2018). Formulation of conclusions about the effectiveness of a marketing campaign or the level of attractiveness of marketing communication can be predicted via EEG (Gauba et al., 2017; Maison & Oleksy, 2017;

Ohme et al., 2010). The brain activity as decoded by EEG can establish the idiosyncratic emotional valence that a particular brand has to bid to the customer (Pozharliev et al., 2019; Ohme et al., 2010). EEG in context to neuromarketing plays a vital role with respect to the interventions mentioned in Table 2.

Table 2: Neuromarketing intervention as decoded by EEG

S.No.	Intervention	Propounded by
1	Indicator for change in preference of brands as stimulated by a television commercial.	Silberstein & Nield, 2015.
2	Ability to draw consumer's attention on the basis of brand attraction.	Wang et al., 2016.
3	Measuring emotional outcomes when subjected to commercial advertisements.	Ambler, 2015; Vecchiato et al., 2014.
4	Association of brand processing with the frontal region (of brain) activity.	Lucchiari & Pravettoni, 2012.

3.4 Human Factors Affecting Consumer Behaviour that are traceable by Neuromarketing

Table 3: Human factors affecting consumer behaviour as discerned by Neuromarketing

S.No.	Human Factors	Justification	Propounder	Year
1	Buyer's Characteristics	Positive / Negative effect on consumer decision making is due to: (i) Attitude (ii) Buying preferences and (iii) Intent to purchase	Ramya and Ali	2018
2	Reptilian Brain	From consumer perspective, the tendency to take purchase decision originates in human brain that helps him feel emotionally attached & eventually evoke impulsive buying.	Morin	2011
3	Consumer Traits	Brain imaging techniques help discern consumer traits like: (i) Consumer satisfaction (ii) Personality characteristics (iii) Risk taking ability (iv) Consumer trust (v) Brand loyalty for better empowering the marketers to suit the consumer interest.	Fugate	2007
4	Psychology and Human Brain	The functions of human brain orchestrate at three levels:	Dragolea and Cotirlea as elaborated by Paul Mc Lean in depiction of	2011

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	Functioning	<p>(i) Unconscious or primitive brain that is responsible for human reactions</p> <p>(ii) Sub-conscious brain that generates emotions</p> <p>(iii) Conscious brain responsible for rationality.</p> <p>These brain levels function in order to manipulate/ influence purchase decision.</p>	model of human brain.	
5	Human Emotions	<ul style="list-style-type: none"> ▪ Consumer emotions like fear, love, anger, sadness, happiness etc. are a resultant of consumer experiences which are manifested in the buying behaviour & decision making exhibited by them. ▪ It has also been observed that consumers often attach emotional aspects to the products they purchase. ▪ Consumers often resonate with the brand personality of products they buy and marketers can map these emotional connects of consumer buying behaviour through empathic design. ▪ Emotions and feelings of consumers evoke the judgement of investors regarding final investment decision. ▪ When consumers get irrational they often end up getting steered by emotions and values in tandem with their personal feelings. 	<p>Penz and Hogg</p> <p>Chitturi</p> <p>Thomas and McDonagh</p> <p>Lucey</p> <p>Levy et al.</p>	<p>2011</p> <p>2009</p> <p>2013</p> <p>2005</p> <p>2008</p>
6	Gender Differences	<ul style="list-style-type: none"> ▪ Depending on the perspective, men and women exhibit their emotions differently. ▪ Men are perceived to be more reactive and women tend to be driven by emotional expression. 	<p>Fisher and Dube.</p> <p>Kring and Gordon.</p>	<p>2005</p> <p>1998</p>
7	Age Gap	<ul style="list-style-type: none"> ▪ In context to e-shopping, people of younger age group exhibit stronger buying behaviour in contrast to their elder counterparts. ▪ The process of aging remarkably affects the emotions and feelings of the consumers. ▪ Both age and gender influence the 	Suman et al.	2019

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		eventual buying behaviour as they affect the consumer emotional responses to various stimuli.	Drolet et al. Diehl et al.	2018 2012
8	Psychological Appraisal	Final consumer decision making is an outcome influenced by two kinds of psychological appraisals: (i) Cognitive Appraisal- Responsible for generating purchase intention. (ii) Affective Appraisal	Chen et al.	2017
9	Processing of Advertising Communication Appeals	<ul style="list-style-type: none"> ▪ Via emotional advertising, the marketers try to grab the consumer's attention and in turn, the consumers base their judgements on the emotions evoked by such advertising communication appeals. ▪ For attracting the attention of women and in order to influence their buying decision, the following ACE approach was employed- <ol style="list-style-type: none"> 1. Appeals (Brand Communication Appeals of Advertising) 2. Endorsements by celebrity in advertisements 3. Emotions (as evoked by advertisements) ▪ Effective advertising techniques not only manipulate the consumers (at psychological level) but also gain the consumer's attention holistically. 	Mukhopadhyay & Johar. Majeed et al.	2007 2017

The above-mentioned human (consumer) - related factors can effectively be gauged by techniques of neuromarketing because all these factors have psychological under-pinning which in turn, generate psycho- physiological manifestations.

4. Research Methodology

This conceptual paper engages an exploratory research design in order to draw inferences. The basis of drawing relevant literature is through systematic search technique employing specific keywords that were considered pertinent to the research title and objective. Various secondary data

repositories were considered for the search based on reliability and authenticity of the data source. The gathered literature was then segregated into parts or frames based on points of commonality (parity) observed through similar meanings (synonyms) or similar concept. This facilitated enhanced conceptualization of the undertaken research by structurally arranging the similar frames on the basis of pattern of commonality. These vital frames were given qualitative treatment of analysis by subjecting them to conceptual framework analysis. The result outcomes of the research were inductive in nature and facilitated the

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depiction of research output in the form of a flowchart (represented in Figure 1).

5. Findings

Based on the applied conceptual framework analysis in the research, the probable findings of the paper are:

- The combination/ multiplicity of emotions evoked by senses cascade a psychological reaction in the human mind that can be detected by neuromarketing techniques.
- Brain scanning techniques of neuromarketing can discern the minutest neural activity orchestrated by human psychology.
- Establishing a nexus between brain activity, psychology, emotions and expressed preference for brands is vital for marketing as it can decode the underlying purchase intentions.
- All feelings and emotions have psycho-physiological bearing that can be justified via neuromarketing.

- EEG in context to neuromarketing can play a role in:
 - Indicating change in brand preference.
 - Fathoming emotional outcomes
 - Measuring brand attraction
- From consumer's viewpoint, impulsive buying behaviour originates in human brain that helps him get emotionally attached to the product.
- It is the sub-conscious brain that generates emotions and this is the seat of psychological chain reactions.
- Consumers attach emotional aspects to the products they purchase.
- Both age and gender influence the final buying behaviour via emotional responses to various stimuli. These emotional responses can be measured via tools and techniques of neuromarketing. The same can be depicted via following representation:

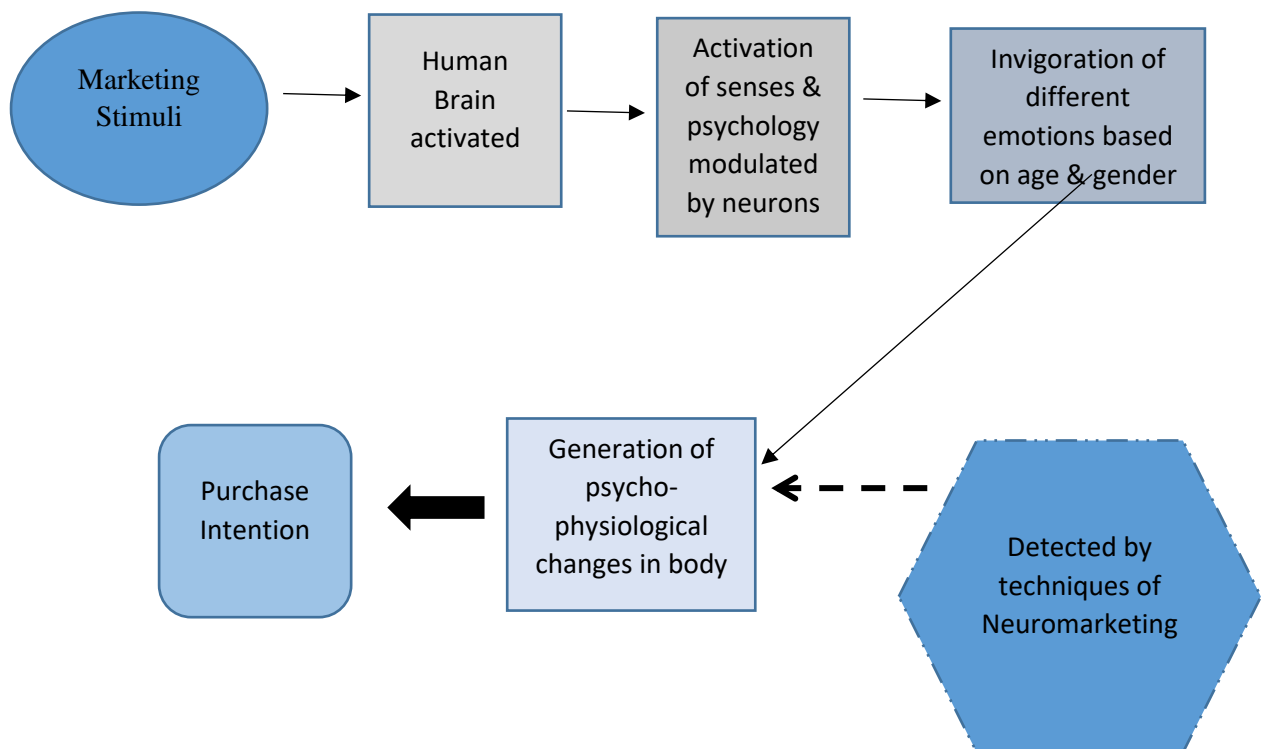


Fig. 1. Proposed nexus between psychology, emotions & neuromarketing.

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6. Conclusion

In contemporary times, the traditional methods of marketing effectiveness evaluation have proved to be ineffective because they cannot excavate the 'hidden information' in the minds of consumers. To fulfil this lacuna, neuromarketing has emerged as a viable solution that scientifically maps the emotions and psychology of consumers in order to predict purchase intention. The paper builds a nexus between emotions, psychology and neuromarketing so that the neuro-physiological techniques drives of the consumer decision making process can be better decoded. There are myriad of consumer traits like consumer psychology, satisfaction/dissatisfaction realms, risk taking ability, emotional drives and eventual purchase intentions that can be predicted with the brain imaging techniques of neuromarketing. The unconscious, sub-conscious and conscious levels of brain work in orchestration to evoke psychologically driven emotions that ultimately mould consumer behaviour. Consumers attach lot of emotional importance to the products they buy. Emotional advertising acts as a marketing stimuli that activates human senses and subsequently evoke different emotions in men and women. These emotions are manifested in the form of certain psycho-physiological changes in the human body. The sensitive techniques of neuromarketing hold potential to decode these changes and act as a proxy for purchase intent. The drafted nexus between emotions, human psychology and neuromarketing is anticipated to take marketing interventions in the direction of positive consumer decision making. The paper heralds promise not only to advertisers, content developers & product managers but also to the point-of-purchase administrators who can better encash on the psychologically driven emotional aspects of purchase intent through neuromarketing.

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