SRI VENKATESWARA INTERNSHIP PROGRAM FOR RESEARCH IN ACADEMICS (SRI-VIPRA)

SRI-VIPRA

Project Report of 2024: SVP-2422

"Neuromarketing Strategies to Access Advertising Impact on Consumer Buying Behaviour in the FMCG Sector."

IQAC
Sri Venkateswara College
University of Delhi
Benito Juarez Road, Dhaula Kuan, New Delhi, New Delhi -110021

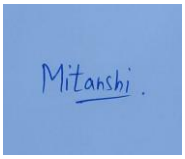
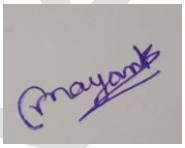
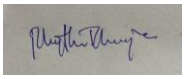
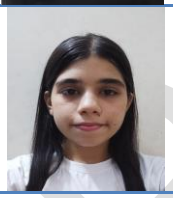
SRIVIPRA PROJECT 2024

Title: Neuromarketing Strategies to Access Advertising Impact on Consumer Buying Behaviour in the FMCG Sector.

Name of Mentor: Mr. Ajit Singh **Name of Department: Commerce** **Designation: Assistant Professor**	

List of students under the SRIVIPRA Project

S. No	Photograph	Name of the Student	Roll number	Course	Signature
1		Dharvi Maheshwari	1022047	B.Com (H)	
2		Harshit Kumar	1022097	B.Com (H)	
3		Ananya Minocha	1722067	B.Sc (H) Mathematics	
4		Tanvi Singh	1022041	B.Com (H)	

5		Mitanshi Chauhan	1022010	B.Com (H)	
6		Sahitya Kumawat	0922031	B.Com (P)	
7		Mayank Kohli	1022109	B.Com (H)	
8		Paridhi Gupta	1022031	B.Com (H)	
9		Rhythm Dhamija	1722008	B.Sc (H) Mathematics	
10		Bhumi	1123118	B.Sc (P) Life Sciences	
11		Prisha Dhawan	1022044	B.Com (H)	

Signature of Mentor

Certificate of Originality

This is to certify that the aforementioned students from Sri Venkateswara College have participated in the summer project SVP-2422 titled **"Neuromarketing Strategies to Access Advertising Impact on Consumer Buying Behaviour in the FMCG Sector".** The participants have carried out the research project work under my guidance and supervision from 1st July, 2024 to 30th September 2024. The work carried out is original and carried out in an online/offline/hybrid mode.

Signature of Mentor

Acknowledgement

At the outset of this report, we would like to express our sincere gratitude and deep appreciation to all the individuals who played pivotal roles in supporting us throughout this endeavour. The successful completion of this project and the invaluable research behind it would not have been possible without the exceptional guidance and unwavering support of our mentor, Assistant Professor Ajit Singh, from the Department of Commerce. His boundless enthusiasm, wealth of knowledge, and meticulous attention to detail served as a constant source of inspiration and kept our work on a steady course.

We extend our heartfelt thanks to our esteemed principal, Prof. Vajala Ravi, for affording us the opportunity and providing continuous encouragement to accomplish this assignment. Additionally, we would like to acknowledge the contributions of the various authors whose insightful work significantly enhanced and enriched our study in countless ways.

Lastly, we take great pleasure in recognizing the invaluable contributions made by all individuals, whether directly or indirectly involved, who played a vital role in the successful completion of this project report. Your support and assistance have been truly appreciated.

TABLE OF CONTENTS

ABSTRACT

Marketing plays an important role in our everyday lives, with digital advertising becoming increasingly prominent. Despite significant investments in advertising campaigns, businesses often face challenges in optimizing their returns, largely due to the unpredictable and complex nature of consumer behavior. This is where neuromarketing comes into play—a field that merges the principles of marketing with insights from neuroscience. Neuromarketing looks into understanding consumer behavior by studying brain activity, eye movements, and other physiological responses. This innovative approach represents a major shift in how businesses approach and understand the motivations behind consumer decisions.

Neuromarketing is a scientific technique of marketing research that has emerged due to the limitations and failures of traditional marketing research. Traditional marketing research tools like questionnaires and surveys derived on consumers' needs and wants by directly enquiring from the consumers. Neuromarketing is based on the idea that consumers may not always be aware of their preferences and what they truly desire. It becomes necessary to tap into the subconscious mind and get a grasp of their inner needs and wants in order to design and market the product in the most effective manner.

Neuromarketing has gained wider acceptance over the years, especially in the field of FMCG products. It employs various brain imaging and physiological techniques to better understand the human brain and how it affects the preferences and purchase decisions of consumers. The study is an introduction to neuromarketing, its techniques, advantages and limitations, and most importantly it contains emerging knowledge of neuromarketing techniques and strategies used in the FMCG industry in India. It discusses the neuromarketing factors in a systematic and coherent manner with the aid of systematically reviewing and explaining the principles, strategies, issues and trends in the field. To come to a relevant conclusion, it is analyzed how far the neuromarketing tools support the marketing managers in advertising FMCG products and influencing consumer purchasing decisions.

Keywords: Neuroscience, Neuromarketing strategies, consumer purchasing decisions, brain imaging, physiological techniques, neuromarketing techniques in FMCG advertisements

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Understanding consumer behavior involves delving into the minds of consumers to comprehend their thoughts, needs, and preferences. Consumer's mind is a complex space which involves dynamic feelings and emotions towards various products and services. The mindset of consumers is built over the years and is something that keeps evolving over time with changes in trends, values and ideologies of the society as a whole.

Hence, understanding how the consumer mind operates is the key to effective marketing. Marketers are always on the look-out to identify how the consumer mind works, what attracts it the most and what factors can lure them towards products. Many of the tools used in the marketing research have remained constant over the years. Surveys and questionnaires, for example, are some of the self-reporting tools that marketers utilise to gain data directly from consumers. In this method, consumers consciously report their preferences and needs which marketers use to create a marketing mix. More often than not, the conscious thoughts reported by the respondents are not their true preferences, or are incomplete. It becomes significant to analyse the subconscious thoughts of the consumers to identify what truly draws them in.

In recent years, there has been a noticeable increase in the visibility and influence of advertisements and digital marketing. Investments in marketing-related initiatives have shown a rise due to dynamic changes within global economies and consumer lifestyles. Businesses continue to invest significantly in marketing campaigns, advertising, and product development, aiming to build consumer trust and foster brand loyalty. Despite these substantial investments, companies often struggle to maximize their return on investment, largely due to the complexity of consumer behavior. Understanding this complexity has proven to be a challenge, a task that has proven difficult despite concentrated efforts by marketers. It is therefore essential that creative thinking and new insights are applied to better understand how consumers behave while making purchases.

With the introduction of information technology, customers can easily compare various options available in the market. Identifying what customers need is a difficult task, which requires a great deal of insight. Even after years of dedication by numerous companies and investing significant amounts, product failures, mistakes, and misinterpretations of customer needs continue to occur. Marketing goes beyond making transactions or having customer interactions; it plays a crucial role in building trust, encouraging loyalty and guaranteeing complete customer satisfaction. Modern times have brought innovation and changes to many aspects of our daily lives. Combining creativity and technology has led to the development of Neuromarketing, a methodological framework in marketing. Marketing and neuroscience have been combined to reveal a method that explores many aspects of consumer behaviour. A major focus of Neuromarketing is investigating the "what," "why," "where," and "how often" reasons behind consumer purchasing decisions by examining brain activity, eye movements, facial expressions, blood oxygen levels, and other factors. By providing deep insights into consumer behaviour in the dynamic marketplace, it represents a paradigm shift in marketing tactics. The Neuromarketing technique brings in a new era of marketing characterised by extensive research and studies aimed at gaining detailed insights into consumer behaviour. Neuromarketing is a discipline that is evolving till date with new discoveries and studies.

Neuromarketing

In today's modern marketing world, understanding consumers' minds has become quite a task. However, combining two different fields—neuroscience and marketing—has led to the development of an innovative and evolving approach called Neuromarketing, which helps in addressing this issue effectively.

The term "neuromarketing" was coined by Ale Smidts from Harvard University in 2002 (Kumar & Singh, 2015). Early studies focused on understanding consumer responses to advertisements, packaging of products, and branding, laying the foundation for today's sophisticated neuromarketing techniques.

As per The Chicago School, neuromarketing is a component of behavioral economics that studies consumer responses to marketing stimuli and using the resulting data for making advertising strategies. Such data is useful for predicting consumer behaviors because a majority of consumer decisions are made or influenced by unconscious processes. The neuromarketing market size in 2023 was valued at nearly $3.3 billion, with

neuromarketing jobs showing a significant rise. This blend of neuroscience and marketing has revolutionized the advertising world and the relationship between businesses and consumers.

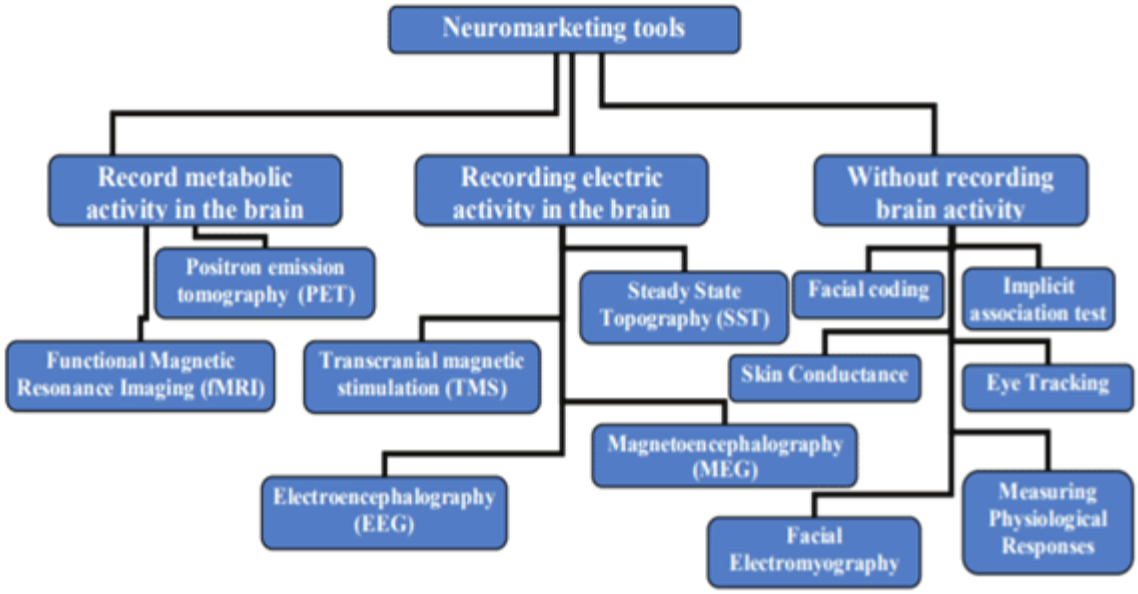
As per Forbes, Neuromarketing offers insights into the subconscious aspects of decision-making, whereas traditional marketing largely relies on self-reported data via surveys or interviews.

Consumer studies is a relatively new field that is gradually becoming popular. It is acknowledged as an interesting concept that is making its way in the field of market research. The basic idea behind this is to use subjective neuroscience to examine the preferences of the consumers and their physiological reactions. Within marketing approaches, Neuromarketing is recognised as a discipline with a practical orientation. Understanding how consumers react to advertising stimuli and how they make decisions about what goods and services to buy is the main focus of Neuromarketing (Sebastian, 2014).

Neuromarketing Techniques

Traditional marketing research methods have had difficulty explaining and predicting the success of advertising campaigns for decades. Emotions play a significant role in consumer responses to messages, making it difficult to understand reactions. Using self-reported feelings through methods like face-to-face interviews, surveys, or focus groups has proven to have a limited scope. These approaches assume individuals are capable of articulating their cognitive processes effectively, disregarding the subconscious factors at play. Furthermore, incentives, time constraints, and peer pressure can distort participants' reports of their feelings. In response to these challenges, neuroimaging techniques have emerged as promising alternatives.

As shown in the figure below, euromarketing techniques can be broadly classified into three categories: Tools that record metabolic activity in the brain, Tools that record electronic activity in the brain, and Techniques that do not record any brain activity.



Source: https://www.researchgate.net/publication/335232446_Ethics_in_Neuromarketing_and_its_Implications_on_Business_to_Stay_Vigilant

Tools that record metabolic activity in the brain

Functional magnetic resonance imaging (fMRI):

The blood oxygen content of the brain is calculated by functional magnetic resonance imaging (fMRI) using a magnetic field and radio waves. This method provides a comprehensive view of the brain's structure and activity patterns. This neuromarketing technique uses brain mapping to find similarities in consumers' brain patterns, helping in predicting common behaviors. Since it mainly measures emotional responses, arousal, and cravings caused by marketing stimuli, fMRI is helpful for developing and testing new products, as well as analyzing packaging and pricing.

Positron Emission Tomography (PET):

PET, like fMRI, identifies brain responses of customers' to marketing stimuli. It works by injecting a small amount of radioactive material into the brain and then measuring the resulting radiation pulses to determine the response to a particular stimulus. However, this method is considered inconvenient by both researchers and participants due to its high cost and the noise it generates (Garczarek Bak, 2019). Despite

these drawbacks, PET can still be used for developing new products, designing packaging, and testing advertising campaigns.

Tools that record electronic activity in the brain

Steady State Topography (SST):

Originally developed for cognitive neuroscience, SST, created by Richard Sebastian, is now used in neuromarketing. It measures a brain response called steady state visually evoked potential (SSVEP), which records electrical activity in the brain when a visual flicker appears in the periphery of vision (Bercea, 2012).

Transcranial Magnetic Stimulation (TMS):

TMS is a non-invasive technique that records brain activity by applying magnetic pulses to the scalp. According to Zurawicki (2010), TMS is more efficient at reducing data compared to fMRI and is also more affordable than fMRI, PET, and EEG.

Magnetoencephalography (MEG):

Magnetoencephalography (MEG) uses a device attached to the subject's scalp to track brain activity with high precision, measuring it every millisecond. However, it is more expensive than EEG technology, as it requires specialized facilities.

Electroencephalography (EEG):

Electroencephalography (EEG) is a common tool in neuromarketing, where a cap with sensors is placed on the subject's scalp to monitor brain activity related to decision-making. It is non-invasive and cost-effective, making it popular among neurologists, psychologists, and researchers (Ohme et al., 2011). EEG can provide insights that traditional marketing surveys may miss.

Techniques that do not record any brain activity

Implicit Association test:

The Implicit Association Test (IAT) is a psychological tool used to measure unconscious biases and associations. In neuromarketing, it helps reveal consumers' implicit attitudes toward brands, products, or advertisements that may not be captured through self-reported surveys. By analyzing reaction times to different stimuli, IAT provides insights into hidden preferences and emotional responses.

Facial Coding:

Facial coding analyzes 43 different facial muscle movements to understand a person's emotional state, such as happiness, sadness, or anxiety. This method generates real-time data and is widely used by companies to test advertisements and earn profits through facial recognition software.

Skin Conductance:

Skin conductance, or galvanic skin response, uses electrodes placed on the hands and feet to gather data. It detects arousal in response to emotional stimuli, allowing it to predict market success across various topics.

Eye Tracking:

Eye tracking measures eye movements in response to advertisements to see if a subject is engaged. It is also used for product research and collecting shopping data. This technique focuses on tracking pupil movements, distinguishing between two types of eye movements: saccades (quick shifts from one point to another) and fixations (pauses on a specific point). Many market research firms now use eye tracking as an effective tool for product development, pricing, and promotions (Santos et al., 2015).

Facial Electromyography (EMG):

Facial electromyography (EMG) is a technique that places electrodes on the facial muscles to measure electrical activity and record emotional reactions. Unlike facial coding, which analyzes 43 muscles, EMG focuses on just two muscles to differentiate between happiness and sadness. This method is often used for product evaluation and ad testing.

1.2 MOTIVATION AND NEED FOR THE RESEARCH

Traditional methods like surveys and questionnaires often fail to fully record how consumers think. Neuromarketing has developed to help fill this gap by studying how the brain reacts to marketing. Many see neuromarketing as a powerful tool that could unlock the secrets of consumer behavior and preferences. It allows marketers to better understand consumers by looking at their psychological responses.

Recently, marketing has evolved beyond just advertisements, as consumers are becoming more aware and want to understand how marketing affects them. Neuromarketing helps businesses create better strategies by studying what grabs consumers' attention, their desires, attitudes, and behavior. This is important for addressing challenges like product failures and weak branding campaigns. Questions like, "How do we choose products without thinking?" and "What influences our choices—ads, brands, or quick decisions?" highlight why understanding neuromarketing is important.

India’s Fast-Moving Consumer Goods (FMCG) sector plays a major role in the economy, with people buying these everyday products that are low-cost and have a short shelf life. The sector is growing because of higher demand and rising prices, especially for essential goods. It also provides about 5% of factory jobs, employing around 3 million people. In the April-June 2023 period, FMCG sales grew by 7.5%, the highest in eight quarters (FMCG Market, FMCG Industry in India - IBEF, n.d.). This growth is driven by rural demand and modern retail stores. This study looks at consumer buying behavior for FMCG products in India, given how important this sector is.

1.3 RESEARCH GAP

Despite the increasing global importance of Neuromarketing, there are only a few studies that explore how Neuromarketing factors like attention, memory, and emotion affect consumer buying behavior, especially in India. Most research does not focus on the social and technological aspects that shape how Neuromarketing strategies are designed to understand how consumers make decisions. Additionally, there is a lack of studies connecting Neuromarketing elements with brand image and consumer behavior in India’s Fast-Moving Consumer Goods (FMCG) sector, a major part of the country's economy.

Although ethical issues related to Neuromarketing are recognized, there are very few quantitative studies that examine how these issues directly impact consumer buying behavior (Brosch et al., 2014; Alba & Chattopadhyay, 1985). Since Neuromarketing is still relatively new in India, this study aims to fill this gap by offering a framework to examine how factors like attention, memory, emotion, and social and technological influences affect consumer behavior and brand image in FMCG products, while also considering ethical concerns.

1.4 STATEMENT OF PROBLEM

In today's world, where consumers are exposed to thousands of advertisements daily, marketing has become an essential part of everyday life. Despite large investments, especially in the Fast-Moving Consumer Goods (FMCG) sector, many products still fail to make a significant impact. Only a small fraction of FMCG launches are considered true innovations. Some of the main reasons for these failures include a lack of deep understanding of consumer behavior, reliance on outdated research methods, and hesitance to adopt insights from behavioral science. With advertising spending in India continuing to rise, it’s crucial for businesses to move beyond traditional methods of market research. New techniques, like Neuromarketing, offer valuable insights into how consumers make decisions, helping to bridge these gaps and provide a more comprehensive understanding of their behavior. Additionally, it’s important to consider the ethical and social factors that influence consumer choices.

1.5 RESEARCH QUESTIONS

Based on the identified research problems, this study addresses the following questions:

- How do neuromarketing techniques differ from traditional marketing methods in influencing consumer buying behavior?
- What impact do neuromarketing elements like music, shelf placement, and color psychology have on consumer decisions compared to traditional marketing strategies?
- How does eye-tracking technology in neuromarketing help understand consumer attention and improve brand positioning?

- What are the limitations of neuromarketing in shaping consumer buying behavior, and how does it compare to the constraints of traditional marketing?

OBJECTIVES

This study aims to investigate the impact of sensory elements on purchasing decisions, with a focus on the FMCG industry. The objectives of the study are fourfold:

1. This study will examine the effect of various sensory stimuli, such as visual and emotional triggers, on consumer preferences and choices when interacting with FMCG products. The study will also investigate how these sensory elements, including color schemes and product design, influence brand recall, emotional engagement, and ultimately, purchasing behavior.

2. The study will utilize eye-tracking technology to measure consumer reactions to FMCG advertisements, packaging, and branding. The study will provide actionable recommendations for marketers on leveraging neuromarketing techniques to improve product appeal and increase consumer loyalty.

3. This study will compare and contrast traditional marketing methods with neuromarketing techniques to demonstrate the added value of using neuroscience-based tools in understanding consumer behavior. The study will address the limitations of conventional consumer research, such as self-reported data, by using neuromarketing to capture unconscious processes that impact purchasing decisions.

4. The study will expand the academic and industry understanding of neuromarketing applications, particularly in the FMCG sector, by offering new insights into how subconscious triggers can be effectively used to influence consumer choices. Additionally, the study will explore the ethical implications of using neuromarketing techniques in advertising and product promotion, particularly concerning consumer privacy and the potential for manipulation, and recommend responsible and transparent practices for FMCG companies adopting neuromarketing strategies.

SYSTEMATIC LITERATURE REVIEWS

The study by (**Ambler, Alexander and Steven, 2000**) highlights the impact of emotional and rational advertising on customers. The authors suggested that emotional advertising and marketing ends in a better stage of reputation and reminiscence in preference to merely cognitive.

The study of (**D. Ariely, G.S. Berns, 2010**) reveals that Neuromarketing techniques in marketing offer benefits as well as limitations. On one hand, neuroimaging can provide valuable insights into consumer preferences and behavior by revealing subconscious processes that traditional methods cannot capture. However, ethical considerations and proper application should always be kept in mind.

(**D. Ariely and G.S. Berns, 2010**) emphasizes that Neuromarketing involves the application of neuroimaging techniques to marketing research. It offers new insights into consumer preferences and decision making processes that are not accessible through traditional marketing methods. Two main reasons can be highlighted for the rise of neuromarketing: They highlight two main reasons for the rise of neuromarketing: irrational behaviors are systematic and predictable, which has significant implications for understanding human behavior and improving decision-making processes.

(**Morin, 2011**) extends the practical implications of neuromarketing out as "the new science of consumer behavior." He suggests on empirical merits, neuromarketing can report better findings that are fundamentally free from the trade-offs common to traditional marketing disciplines such as survey-based or focus group data collection methods that could introduce bias or flawed behavior of interest based on consumer prompted self-reported data. Morin highlights neuromarketing measures; attentiveness, perceived memory, retention related to brand recollection, and emotion toward an ad can all help understand effective advertising related both to brand positioning by label and image.

The study by (**Morin & Patrick, 2011**) highlights that neuromarketing is a technique which researches brain responses of consumers while they are subjected to marketing stimuli. Moreover, they mentioned discovering extensive neurological activities and related solutions to marketing stimuli which have been tested unsuccessful in accurately reading patron mentalities.

The study by (**Patrick & Morin, 2011**) highlights that Neuroscience includes the aggregate of neuro and advertising which presents connections between scientific principles or can be said as a combination of Neuroscience and advertising. He moreover cautioned that Neuroscience might be used to help entrepreneurs to apprehend how advertising could have an impact on human thoughts.

The study of (**G Orzan, IA Zara, VL Purcarra, 2012**) analyzes how neuromarketing techniques may impact the consumer response to pharmaceutical advertising campaigns. The results showed that using neuromarketing methods, a pharmaceutical company can better understand conscious and unconscious consumer's thoughts.

The study of (**Dargi, 2013**) highlights that in brand new times advertising and marketing is getting harder and harder each day. He referred that they're getting diminished into clients thoughts and now not in reality helps in choosing purchase behaviour. The primary point is thoughts unconsciously records and collects statistics and refines these data.

The study conducted by (**University of Sao Paulo, Brazil, 2014**) surveyed main neuromarketing techniques used in the world and obtained practical results. The various objectives were- (a) to identify existing definitions of neuromarketing; (b) identify the importance of potential contributions of neuromarketing c. identify ethical issues involved with neuromarketing research and many more.

The study conducted by (**Lobna Ben, MA University of Carthage, ISCU, Tunisia, 2014**) explores the contribution of neuroscience techniques and findings as well as priming processes to promote efficiency of commercial advertising of consumer goods in modern society.

The study of (**A.Thangaraja, 2015**) states that Neuromarketing plays a significant role in enhancing brand decisions in the FMCG sector. The study highlights that neuromarketing provides critical insights into the subconscious mind and influences brand preference.

(**Harit, Priyanka, 2015**) states that Neuromarketing integrates neuroscience with marketing and offers a more profound understanding of consumer behavior by utilizing various neuromarketing tools. The study underscores the significance of addressing emotional and psychological aspects of consumers to have a holistic approach.

The study conducted by (**International Journal of Engineering and Management Research, 2015**) explores insights of psychiatry and social technological know-how to influence our picks and behavior. They suggested motivational studies and intensity techniques to attain the purchaser's unconscious minds.

The study by (**Mohammad Osman, S.M. Saleh, Md Rabiul, S.M. Salim, 2015**) explores the insights that Neuromarketing as a contemporary issue going made an evolutionary history. Different methodologies are being used to get hidden and unaware subconscious minds, which is not possible by conventional marketing research.

The study conducted by (**Dr. Ritty Francis, Reena R., 2016**) highlights superb illustration of products and by engaging in intensity evaluation through neuromarketing techniques, shopping for behavior might be genuinely high and lead to a boom in income.

The study by (**Jakub Bercik, Elena Horska, Jana Galova, Eko Sri Margianti, 2016**) highlights that consumers' buying decisions are affected by many factors in the sales environment, such as the music playing in the background and the merchandising of the products. A researcher used an Emotiv EPOC headset, eye tracker and heat maps and tested the respondents in a laboratory. Respondents were tested to four sales environment: first where the wine shop has no music, second where the wine shop has slow French music, third where fast Slovac music is playing and fourth where the wine shop has no music and there are two shelves of wine, one with only 1 bottle of wine and other shelf with plenty of bottles stuck together. The experiment proved that consumers are indeed positively influenced if they shop in conditions where music is playing rather than an environment where music is not playing. Also, when consumers spot a product which is placed alone, they place special significance to that product under the impression that it is a premium product.

According to (**Dijana, hendal, Croatia, 2016**), Neuromarketing is a new discipline that combines behavioral psychology, economics and consumer neuroscience. It allows the researchers to gain insights into unconscious drivers of choice and preference which was not possible with traditional marketing methods

The survey conducted by (**Antonio, Gianluigi, M. Irene, University of Salento, 2016**) reveals that neuromarketing operates on the premise that sensory and motor systems can be mapped to specific brain cell networks, revealing subconscious aspects of consumer behavior. Nanotechnologies offer a solution to

limitations of neuromarketing by enabling noninvasive and real-time monitoring in the natural environment.

The study by (**Zineb, Larbi, Jiddane, Hadj Omar, Ali Benomar, 2017**) states that Neuromarketing is a new field where brain science and marketing meets. The findings of the human reward system has an important role to play in neuromarketing research. However, it suffers from many limitations which are a barrier for its development.

In study by (**Lina, Viktorija, 2017**), the authors explore the impact of selecting a female advertising spokesperson on the effectiveness of FMCG advertising. The findings suggest that if the objective of the advertising campaign is to shape consumer attitudes, a celebrity spokesperson is advantageous.

The study by (**Ubaldo Cuesta, Luz Martinez, Jose Ignacio Nino, 2018**) highlights the presence of music in advertising influences viewers' attention, emotional responses, and brand perception. A combination of psychophysiological measurement tools, including GSR, eye tracking and facial expression analysis was used to understand the effect of music and its absence on participants. It was concluded that music significantly enhances attention and positive emotional responses in advertising, although it did not lead to substantial differences in brand perception metrics between the two conditions. This suggests that while music can improve engagement, it may not directly alter consumers' overall perceptions of the brand.

The study conducted by (**Lim, 2018**) emphasizes that neuroscience strategies may be divided into three instructions: neural interest recording tools (inside the thoughts), neural pastime recording equipment (outdoor brain) and intervention techniques.

According to (**Pravin Raj Solomon, 2018**), Neuromarketing involves a deep study into the brain and its processes. Different regions of the brain are responsible for short term and long-term memory. Neuromarketing techniques can be classified into two types: outside reflex and inside reflex. Outside reflex includes body language, empathetic design, facial coding and eye tracking. Inside reflex consists of EEG, FMRI, MEG, PET, eye tracking, electromyography, cardiovascular parameters, galvanic skin response, transcranial magnetic stimulation.

The study conducted by (**Nisha, 2018**) highlights that Neuromarketing leverages neuroscientific methods to understand and influence consumer decisions without requiring conscious thought. Various

neuromarketing tools, such as multisensory stimulation, sound and color effects, reward systems, and brand revitalization through animated logos can effectively attract consumers. While neuromarketing is successful in driving impulsive purchases typical of FMCG, its effectiveness in complex buying decisions, such as those for white goods (e.g., refrigerators, televisions), is less clear. Complex purchases involve more deliberation, considering factors like warranty and brand reputation. However, major brands still utilize neuromarketing strategies to establish a presence in consumers' minds. In conclusion, neuromarketing is a valuable tool for marketers, applicable to both FMCG and white goods, but the consumer decision-making process remains complex and multifaceted.

In addition to her studies (**Nisha Saha, 2018**), also added that digital marketing can trigger impulses much more when marketers do online marketing. Companies like Flipkart and Amazon follow these strategies. Both white and FMCG goods producers are adopting this technique. Neuromarketing impacts impulsive purchase in FMCG goods but it’s not relevant in case of complex buying decisions of electronics or home appliances.

According to (**Lim, W.M., 2018**), Neuromarketing is an interdisciplinary field, which combines neuroscience and marketing to understand consumer preferences and decision-making processes through brain-activity analysis. The author also identifies future directions for neuromarketing including integration with big data, leveraging technological advancements and promoting interdisciplinary collaboration as well.

The survey conducted by (**Jimmy Thankachan and Raksha Yadalam, 2018**) highlights neuromarketing research using a structured questionnaire to collect data from a sample of 150 respondents across different age groups and genders. The data collection involved close-ended questions measured on a Likert scale (ranging from 1 to 5) and nominal scales to assess various variables. The findings indicated that neuromarketing techniques, such as eye tracking and emotional response measurement, significantly enhance consumer attention and retention. The study highlighted that certain visual elements, like brighter colors and strategic placement of key objects in advertisements, effectively capture consumer interest. Additionally, it was found that traditional marketing methods, while still relevant, do not provide the same depth of insight as neuromarketing techniques. The research suggests that marketers should adopt these advanced techniques to bridge the gap between consumer expectations and marketing efforts, ultimately leading to more successful advertising campaigns.

The study by (**Valentin Hapenciuc, Pavel Stanciu, Ruxandra Bejinaru, 2019**) highlights that companies are utilizing various neuromarketing techniques and strategies for influencing consumers' emotions. Some of the strategies are using multisensory stimulations, striking headlines, limited editions and efficient web designs. The conclusion was that neuromarketing is the ultimate tool that can be optimized to gauge consumers 'emotions, feelings and thoughts. Neuromarketing can be used by companies to conduct product improvements and testing in such a manner that ultimately they make the product the most appealing to the consumers.

According to (**Sarah, Aarushi, Mehak, 2020**), neuroscientific techniques can uncover complex consumer behaviors. Neuromarketing has potential to enhance marketing strategies but also comes with high costs and ethical concerns.

The study by (**Yasir Khan Khalil, Mukharif Shah, Haider Ali, Sajid Khattak, 2020**) states that color is yet another independent variable that influences consumer psychology. About 62% to 90% of a product assessment is based on colors alone. Study of color psychology reveals that different colors mean different things to different cultures across the world, how different colors portray numerous emotions, how different genders perceive colors differently and many more such connections. It is concluded that color does not have a single meaning to any person. It can mean different things depending on the background of the person.

The study of (**Gurgu, 2020**) highlights that Neuroscience is one of the new branch of enterprise that can be said to be today's partnership and combines psychology and neuroscientific understanding with commercial enterprise. He additionally brought how neurobiological preferences have been multiplied in numerous years.

According to (**Shaip Bytyçi, 2020**), color is a significant aspect of marketing a product. It plays an important role in product packaging and advertising because they are what draws the attention of the consumers in the first place. A survey revealed that knowledge of color psychology can greatly help businesses in making the correct decisions. It has to be noted that colors are interpreted differently across different cultures so marketers have to be careful while selecting product packaging or logo.

The study by (**A. Thom Thomas and R. Priyadarsini, 2020**) explores that while neuromarketing can provide valuable insights into consumer preferences and enhance marketing strategies, it also raises

significant ethical questions that must be addressed. The increasing use of neuroimaging technologies in marketing creates space for ethical concerns. Key ethical issues include consumer privacy, the potential for manipulation, and the broader societal impacts of using neuroscientific methods to influence consumer behavior. Hence it is significant that some ethical guidelines and regulatory frameworks must be put in place to ensure that neuromarketing practices are conducted responsibly and do not exploit consumers.

According to (**Ingrit, Jesus Garcia-Madariaga, Maria-Francisca, 2020**), the application of neuromarketing techniques to study food packaging has recently gained considerable popularity both in academia and practice but still faces some concerns about the method and metrics commercially offered.

(**Miguel, Antonio, Mario, 2020**) states that neuromarketing has aroused great interest in scientific research about consumer behavior and, consequently in the advertising industry, which is searching for an alternative to traditional techniques for measuring efficacy.

According to (**Rupali, Jaiteg, 2020**), Neuromarketing, being an interdisciplinary research area, has emerged as a solution for achieving better understanding of consumer behavior. The existing approaches ignore integrated framework for understanding neurometric data.

The study conducted by (**Dr. K. Maran, Moonisha, Dinesh, Dr. Maran, Dr. V. Anbazhagan, 2020**) highlights the fact that neuromarketing offers deep insights into consumer decision-making processes, especially unconscious response and emotions which traditional marketing fails to capture. Neuromarketing tools enhance brand positioning, packaging, celebrity endorsements and influence purchase intentions.

The study conducted by (**Natalia, Jesus, Daniel, 2020**) highlights the impact of emotional and rational advertising on customers. Additionally, authors described social reasons which drive humans to apply social networks for their use.

According to (**Jatoth Sai Kiran and Rajkiran Prabhakar, 2021**), various neuromarketing techniques like- Functional Magnetic Resonance Imaging (fMRI) is highlighted as a key tool for measuring brain activity by assessing blood oxygen levels in response to marketing stimuli, Electroencephalography (EEG) and other methods that do not directly measure brain activity but still provide insights into consumer behavior.

The study conducted by (**Alsharif, Nor Zafir, Rohaizat, Alharthi, 2021**) gives a systematic review and bibliometric analysis of neuromarketing tools used in empirical research over the last five years. EEG was identified as the most frequently used tool followed by eye-tracking and Galvanic skin response.

(**Kiran, J.S., Prabhakar, R., 2021**) states that Neuromarketing has a big role in understanding consumer decision-making and provided a deep review on this topic. It highlights the advanced neuroimaging techniques like EEG and fMRI, eye tracking, which offer insights into emotional and cognitive responses during various stages of the decision-making process.

According to (**Doe and Roe, 2022**), Neuromarketing is a transformative tool in advertising. Various neuromarketing techniques including fMRI and facial coding, have been used to understand consumer reactions to advertisements. Deeper insights into consumer psychology can lead to more effective and personalized marketing campaigns.

The study conducted by (**Ali Ismajli, Besime Ziberi, Ardita Metushi, 2022**) highlights that every company nowadays seeks to understand the consumers' thought process and buying decision. Neuromarketing can certainly help in identifying the preferences of the consumers. A self-made questionnaire was used by a researcher to collect data and use Likert scale to drive results. The data revealed that the maximum number of respondents placed importance on the quality of a product, the color of the packaging, product information, selling price of the product, promotional discounts in the product advertising, and service quality. This shows that neuromarketing can disclose data regarding consumers' buying preferences and decision making that cannot be found through traditional methods.

The study by (**Ahmed H. Alsharif, Nor Zafir Md Salleh, Mazilah Abdullah, Ahmad Khraiwish, and Azmirul Ashaari, 2023**) detailed the concept of neuromarketing, classification of neuromarketing techniques and neuromarketing techniques' application in marketing mix. They used the e Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework to select relevant documents for this article. They collected 106 articles from the Web of Science. The paper delved deep into how neuromarketing techniques have been proven to be used in advertising, product, pricing and branding.

(**Abdigali, M., Baiguzhina, Krasynkh, Kadyrbay and Kuandyk, 2023**) states that the fast-moving consumer goods (FMCG) industry is highly competitive, with companies and constantly seeking

innovative ways to understand consumer behavior and enhance the marketing strategies through neuromarketing techniques.

(**Alex Ovcharov, 2023**) found in his research that Neuromarketing or consumer neuroscience analyzes the brain activity in response to marketing stimuli through tools like fMRI, EEG, facial coding and eye-tracking. The study underscores the challenges faced by FMCG brands in differentiating themselves amidst evolving shopping culture and increasing customer expectations.

The study conducted by (**Ashok Kumar Parsoya, 2023**) reveals that Neuromarketing has become an essential tool for companies to gain a competitive edge by better understanding the psychological drivers behind consumer behavior and enabling more effective marketing strategies and customer relationship management.

According to (**C.H. Indrasena Reddy, Dr. R. Senthilkumar, 2023**), Neuromarketing helps in understanding the personalities of FMCG consumers, specifically exploring the traits of extraversion. Findings indicate that neuromarketing can effectively identify and leverage key personality traits to influence consumer behavior in the FMCG sector.

The study by (**Xin Li, Ding-Bang Luh and Zihao Chen, 2023**) applies various eye-tracking dependent variables to investigate consumer visual attention related to four common interface design factors: brand, endorser, product, and text. From the research, it is generally demonstrated that a variety of stimuli items including goods, wines, advertisements, and brand items within every commercial domain has a positive influence. This study contained 17 papers with a total of 1071 participants. Not only total time of fixation, fixation count, time to first fixation but also other indicators may be strongly correlated with consumer preference. The results from this extensive inquiry provide compelling evidence that the inclusion of captivating design elements, including the brand, endorser, product, and text, can bring about a significant change in the number of fixations observed and the time delay before the first fixation occurs.

The study by (**Natalia, Olga, Ella, Velgosh, 2023**) investigates the impact of cryptographic marketing, specifically QR codes, on consumer visual perception in the dairy industry. It involved a comprehensive neuromarketing experiment to determine optimal placement of QR codes on soft milk packaging and results stated that placement of QR codes influence consumer attention and brand memorability.

(**Bercea, 2023**) highlights that the companies are always looking for a small window into their customers minds to know personalities they are unaware of and this insight needs to be supported by logic and realism. Research shows that neuromarketing encompasses all physiological and cognitive processes as it involves the brain and central nervous system.

According to (**Dina Abdigali, Madina Baiguzhina, Maxim Krasnykh, Yernur Kadyrbay, Dilnaz Kuandyk, 2023**), Neuromarketing techniques influence consumer behavior and sales in the FMCG sector. Customer survey was conducted to gather data on consumer demographics, purchasing habits, product preferences, and the influence of neuromarketing techniques on decision-making. The sample size was determined to be 105 participants, ensuring a diverse representation from major cities in Kazakhstan. It revealed the importance of appealing to all senses to create a comfortable shopping environment, which positively influences key performance indicators such as traffic, time spent in-store, and overall sales turnover.

The study by (**Smith and Johnson, 2023**) explores that neuromarketing techniques impact consumer behavior in online purchasing environments. Independent variables like neural and psychological responses can predict and influence dependent variables like buying decisions. Neuromarketing can significantly enhance online advertising effectiveness by tailoring content to elicit specific neural responses that drive purchasing intentions.

The study conducted by (**Aleksandar Mihajlovic, Jelena Gajic, Tamara Papic, 2023**) highlights how neuromarketing tools could analyze consumer reactions to advertising campaigns, focusing on the emotional and cognitive impacts of various campaign elements. The study utilized a hardware and software system called MojoAI, which broadcasts animated content and anonymously records visitor reactions. This system analyzes viewer sentiment (positive, neutral, negative), age cohort, and gender while ensuring compliance with data protection regulations (GDPR). The study employed sentiment analysis to evaluate consumer feelings in real-time during the campaign. The findings revealed significant differences in visitor reactions to different campaign contents, particularly for the ICT and hospitality campaigns. The study concluded that the use of AI solutions like MojoAI enables a better understanding of target group preferences and interests, facilitating data-driven decision-making in advertising. The authors emphasized that neuromarketing technologies provide invaluable insights into consumer emotions and behaviors, allowing advertisers to create more effective campaigns and improve user experiences.

(**Amine Bentahar, Forbes Council Member, 2023**) stated that at present, there is no external authority providing neuromarketing full-blown laws, they can still use moral considerations and ethical guidelines borrowed from other quarters. These are neuroethical aspects of neuromarketing. Transparency should be maintained to foster trust of the customers.

According to (**Alex Ovcharov, 2024**), Brain marketing can spot patterns in what people choose because shoppers might go for things that are easy to grab. Consumers' decisions can also be derived from thoughtful selection of rich colors that go well with features. Neuromarketing statistics can bring into light weak points and amend with strategies that make money distribution more effective for better solutions.

(**Khondakar et al., 2024**) emphasizes that EEG has extensive application in neuromarketing studies. It can help in understanding consumer preferences and behavior. EEG technique has various frequency bands such as theta, alpha, beta and gamma that help in driving neuromarketing results. Results from various studies have also compiled classification of different kinds of stimuli, such as products, advertisements, and images. Yet despite the possibilities of neuromarketing it is important to address challenges and ethical considerations such as privacy concerns and data accuracy.

In another study conducted by (**Olena Chygryn, Kateryna Shevchenko & Oleh Tuliakov, 2024**), it was revealed that in the field of neuromarketing, there are methods that can be conditionally divided into those that register activity in the brain (neurological) and those that register activity outside the brain (biometric). Pupil Labs, an invisible mobile eye tracker was used as the main tool for neuromarketing research. According to the results of the two stages of the experiment, heatmaps were obtained, which are described by the key metrics of the study: fixations and points of view, heatmaps, areas of interest, and time spent.

FINDINGS

Overall, a number of independent factors were identified from the systematic literature reviews, including emotional marketing, shelf placement of the product, presence of celebrity spokesperson, use of music in shopping spaces, colour psychology, design elements and comfortable shopping experience. All these influences consumer psychology in one way or the other.

- Emotional marketing is known to create more impact in consumers' minds than rational marketing, fostering better reputation and reminiscence in consumers' minds. This is because emotional marketing taps into the subconscious mind of the consumer, creating a deeper connection with the brand.

- Neuroimaging provides valuable insights into consumer preferences and behavior by revealing subconscious processes that traditional marketing couldn't capture. By using neuroimaging techniques, marketers can gain a better understanding of how consumers respond to different marketing stimuli.

- Neuroscience techniques and findings help promote the efficiency of commercial advertising of consumer goods in modern society, enabling entrepreneurs to understand how advertising impacts human thoughts. This knowledge can be used to create more effective advertising campaigns that resonate with consumers.

- Neuromarketing techniques lead to superb illustration of products, and by engaging in intensity evaluation techniques, shopping behavior might become genuinely high, ultimately leading to a boom in income. By using neuromarketing techniques, marketers can create a more engaging and immersive shopping experience for consumers.

- Consumers spot a product when it's placed alone, under the impression that it might be a premium product, highlighting the importance of shelf placement. This is because consumers are more likely to notice a product that stands out from the rest, and placing a product alone on a shelf can create a sense of exclusivity.

- There is a significant impact of celebrity spokesperson on the effectiveness of FMCG advertising campaigns, if the objective is to shape consumer attitudes. Celebrity endorsements can help to increase brand awareness and credibility, especially among younger consumers.

- Music significantly enhances attention and leads to positive emotional responses, although it may not directly alter consumer's overall perception of the brand. Music can be used to create a more engaging and memorable advertising experience, and can help to increase brand recall.

- Color psychology impacts the consumer decision-making process, but it does not have a single meaning to any person and depends on the background of the person. Different colors can evoke different emotions and reactions in consumers, and marketers need to consider the cultural and personal associations of different colors when creating marketing campaigns.

- Neuromarketing involves deep study of the human brain and its processes, and neuromarketing techniques can be classified into inside and outside reflexes. By understanding how the brain responds to different marketing stimuli, marketers can create more effective marketing campaigns that resonate with consumers.

- Functional Magnetic Resonance Imaging (fMRI) and Electroencephalography (EEG) are the two main key neuromarketing techniques that measure brain activity and provide insights into consumer behavior. These techniques can help marketers to understand how consumers respond to different marketing stimuli, and can provide valuable insights into consumer preferences and behavior.

- The Likert scale helped identify that the maximum number of respondents placed importance on the quality of a product, the color of the packaging, product information, selling price of the product, promotional discounts in the product advertising, and service quality. By understanding what factors are most important to consumers, marketers can create more effective marketing campaigns that meet their needs and preferences.

- The inclusion of captivating design elements, including the brand, endorser, product, and text, can bring about a significant change in the decision-making process of consumers. By using design elements that are visually appealing and engaging, marketers can create a more immersive and memorable shopping experience for consumers.

- A comfortable shopping environment positively influences key performance indicators such as traffic, time spent in-store, and overall sales turnover. By creating a comfortable and welcoming shopping environment, marketers can increase consumer engagement and loyalty, and ultimately drive sales.

- The use of AI solutions like MojoAI enables a better understanding of target group preferences and interests, facilitating data-driven decision-making in advertising. By using AI solutions, marketers can gain a deeper understanding of consumer behavior and preferences, and can create more effective marketing campaigns that resonate with consumers.

- Neuromarketing statistics can bring into light weak points and amend with strategies that make money distribution more effective for better solutions. By analyzing neuromarketing statistics, marketers can identify areas for improvement and optimize their marketing campaigns to achieve better results.

CONCLUSION

In conclusion, this study aims to delve deeply into the complex interplay between neuromarketing techniques and consumer behavior, particularly in the fast-moving consumer goods (FMCG) industry. As traditional marketing approaches have proven limited in understanding the subconscious drivers of consumer decisions, our research focuses on analyzing emotional cues, color psychology, and sensory elements that influence purchasing choices. By employing eye-tracking software to gauge visual attention and emotional responses, we aim to uncover hidden insights into how consumers interact with advertisements and product packaging.

The research draws on the expanding field of neuromarketing, which integrates principles of neuroscience with marketing, offering a more profound and empirical understanding of consumer preferences. Our study aligns with previous findings that emphasize the importance of emotional engagement and visual stimuli in shaping consumer memories and brand recall. As highlighted in the literature, neuromarketing provides unique opportunities to address both the conscious and unconscious aspects of consumer behavior, offering a holistic perspective that traditional methods fail to capture.

The results of this study will have broad implications for marketing professionals, especially in FMCG, where rapid and often impulsive buying decisions are key. Understanding how subtle factors like color schemes, emotional triggers, and visual appeal impact consumer behavior will enable marketers to design more effective and targeted advertising strategies. By tapping into the subconscious mind, brands can enhance their product positioning, foster brand loyalty, and ultimately drive higher sales.

Furthermore, this study will contribute to the ongoing academic discourse on the ethical considerations of neuromarketing. As the use of neuroimaging and physiological tracking in marketing expands, it is essential to ensure that consumer rights are protected, particularly in terms of privacy and manipulation concerns. Our research will emphasize the importance of applying neuromarketing techniques responsibly, keeping in mind both commercial benefits and consumer well-being.

The findings of this study also have significant implications for the development of more effective marketing campaigns. By understanding how to create emotional connections with consumers, brands can create more memorable and impactful advertising. This can be achieved through the use of storytelling, vivid imagery, and other techniques that tap into the consumer's emotional psyche. Moreover, the study's results can inform the development of more targeted and personalized marketing strategies, which can help to increase customer engagement and loyalty.

In addition to its practical applications, it also contributes to the ongoing theoretical debate about the nature of consumer behavior. By shedding light on the neural mechanisms underlying consumer decision-making, we can develop more accurate models of consumer behavior and improve the predictive power of marketing analytics. This can help to inform the development of more effective marketing strategies and improve the overall efficiency of marketing campaigns.

Its results also have implications for the development of more effective packaging and product design. By understanding how visual stimuli and emotional triggers impact consumer behavior, brands can design

more appealing and effective packaging that resonates with consumers. This can help to increase sales and improve customer satisfaction, ultimately driving business growth and profitability.

In essence, the conclusions drawn from this study will serve to bridge the gap between neuroscience and marketing, highlighting how FMCG companies can use neuromarketing insights to refine their strategies and better meet consumer expectations. This study highlights the importance of interdisciplinary collaboration between neuroscientists, marketers, and industry professionals. By working together, we can develop a more nuanced and comprehensive understanding of consumer behavior and develop more effective marketing strategies that take into account the complex interplay between cognitive, emotional, and social factors that influence consumer choice. This research not only advances the field of consumer neuroscience but also offers actionable recommendations for brands seeking to gain a competitive edge in a rapidly evolving marketplace.

REFERENCES

Ambler,T.,Burne T., Steven A.,(2000). The impact of affect on memory of advertising. Journal of Advertising Research, 39(2), 25-34. https://www.researchgate.net/publication/288284979_The_impact_of_affect_on_memory_of_advertising

Ariely, D. (2009). Predictably Irrational: The Hidden Forces that Shape Our Decisions. HarperCollins UK.

Ariely, D., & Berns, G.S.,(2010). Neuromarketing: The Hope and Hype of Neuroimaging in Business. Nature Reviews Neuroscience, 11(4), 284-92. https://www.researchgate.net/publication/41669613_Neuromarketing_The_Hope_and_Hype_of_Neuroimaging_in_Business

Ariely, D., & Berns, G. S. (2010). Neuromarketing: The hope and hype of neuroimaging in business. *Nature Reviews Neuroscience*, *11*(4), 284-292. https://doi.org/10.1038/nrn2795

Morin, C. (2011). Neuromarketing: The New Science of Consumer Behavior. Society, 48(2), 131–135. https://doi.org/10.1007/s12115-010-9408-1

Morin, C., & Patrick, V., (2011). Neuromarketing: Understanding consumers' subconscious responses to marketing stimuli. Journal of Consumer Marketing, 28(3), 222-229. https://doi.org/10.1108/07363761111139621

Orzan,G., Zara, I.A.,& Purcarea, V.L.,(2012). Neuromarketing techniques in pharmaceutical drugs advertising. A discussion and agenda for future research. Journal of Medicine and Life, 5(4), 428-32 https://www.researchgate.net/publication/235368788_Neuromarketing_techniques_in_pharmaceutical_drugs_advertising_A_discussion_and_agenda_for_future_research

Dargi, S., (2013). The challenges of modern advertising: Understanding unconscious consumer behavior. International Journal of Marketing Studies, 5(3), 1-10. https://doi.org/10.5539/ijms.v5n3p1

University of São Paulo, Brazil.,(2014). A Review of studies in Neuromarketing: Practical Results, Techniques, Contributions and Limitations. Journal of Management Research, 6(2), 201. https://www.researchgate.net/publication/285669724_A_Review_of_Studies_on_Neuromarketing_Practical_Results_Techniques_Contributions_and_Limitations

Ben, L.,(2014). Neuroscience Techniques and the Priming Processes Significance to Neuromarketing Advertising. European Scientific Journal, Volume 1, 1857-7881. https://www.academia.edu/75513824/Neuroscience_Techniques_and_the_Priming_Processes_Significance_to_Neuromarketing_Advertising

Thangaraja,A.,(2015). The Veiling Part of Neuromarketing in Developing Brand Preference in FMCG Sector: A Conceptual Study. IJARIIE_ISSN(O), Volume 1,2395-4396. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3713517

Harit, P., (2015). The significance of Neuromarketing in understanding consumer behavior: A focus on emotional and psychological aspects. International Journal of Marketing Studies, 7(2), 12-20. https://www.journalijdr.com/sites/default/files/issue-pdf/28051.pdf

Singh,P., (2015). Neuromarketing: An Emerging Tool of Market Research. International Journal of Engineering Business Management. 5(6), 530-535.

https://www.researchgate.net/publication/305640494_Neuromarketing_An_Emerging_Tool_of_Market_Research

Gani, M. O., Saleh, S. M., Rabi, M. R. I., & Reza, S. (2015). Neuromarketing: Methodologies of Marketing Science. ResearchGate. https://www.researchgate.net/publication/316473088_Neuromarketing_Methodologies_of_Marketing_Science

Francis R,., Reena R.,(2016). A study on neuromarketing: A unique bond between consumer's cognizance and marketing. International Journal of Commerce and Management Research, Volume 2, Issue 11, 51-54. https://www.managejournal.com/archives/2016/vol2/issue11/2-11-13

Bercik, J., Horska, E., Galova, J.,& Margianti, E.S., (2016). Consumer Neuroscience In Practice: The Impact of Store Atmosphere on Consumer Behavior. Periodica Polytechnica Social and Management Sciences, 24(2). https://www.researchgate.net/publication/297728044_Consumer_Neuroscience_in_Practice_The_Impact_of_Store_Atmosphere_on_Consumer_Behavior

Dijana C.,(2016). Neuromarketing in Market Research. Interdisciplinary Description of Complex Systems, Volume 14(2), 139-147.https://ideas.repec.org/a/zna/indecs/v14y2016i2p139-147.html

Antonio, G., & Irene, M., (2016). Neuromarketing: A new frontier for neuromarketing. Psychology & Marketing, Volume 33, 664-674. https://www.econbiz.de/Record/nanomarketing-a-new-frontier-for-neuromarketing-mileti-antonio/10011534736

Berčík, J., Horská, E., Gálová, J., & Margianti, E. S. (2016). Consumer Neuroscience in Practice: The Impact of Store Atmosphere on Consumer Behavior. Periodica Polytechnica. Social and Management Sciences, 24(2), 96–101. https://doi.org/10.3311/ppso.8715

Zineb, L., Larbi, J., hadj Omar, J., & Benomar, A.,(2017). Neuromarketing : Where marketing and neuroscience meet. Global Journal of Business Management, Volume 11, 001-005. https://www.internationalscholarsjournals.com/abstract/neuromarketing-where-marketing-and-neuroscience-meet-67149.html

Lina, G., & Viktorija, M., (2017). The effect of female celebrity spokesperson in FMCG Advertising: Neuromarketing approach. Journal of Consumer Marketing, 34(3). https://www.researchgate.net/publication/315531138_The_effect_of_female_celebrity_spokesperson_in_FMCG_advertising_neuromarketing_approach

Martinez, L. M., Cambra, U. C., & Niño, J. I. (2018). 2018 Neuromarketing. Analysis of Packaging Using Gsr, Eye-Tracking and Facial. ResearchGate. https://www.researchgate.net/publication/347975235_2018_Neuromarketing_Analysis_of_Packaging_Using_Gsr_Eye-Tracking_and_Facial

Lim, J., (2018). Demystifying Neuromarketing. Journal of Business Research. Volume 91, 205-220. https://www.sciencedirect.com/science/article/abs/pii/S0148296318302716

Solomon, P.R.,(2018). Neuromarketing: Applications, Challenges and Promises. Biomedical Journal of Scientific and Technical Research. ISSN, 2574-1241. https://www.researchgate.net/publication/331350596_Neuromarketing_Applications_Challenges_and_Promises

Saha, N., (2018). Impact of Neuromarketing: FMCG Vs. White Goods. REST Journal on Emerging trends in Modelling and Manufacturing. Volume 4(4), 2455-4537.

https://restpublisher.com/wp-content/uploads/2019/03/Impact-of-Neuromarketing-FMCG-Vs-White-Goods.pdf

Thankachan, J., & Yadalam, R., (2018). A Study on Impact of Neuromarketing techniques on consumer buying behavior with respect to attention and retention of the marketing efforts. Volume 5, Issue 3, ISSN: 2349-5162. https://www.jetir.org/view?paper=JETIR1803077

Cuesta, U., Martínez-Martínez, L., & Niño, J. I. (2018). A Case Study in Neuromarketing: Analysis of the Influence of Music on Advertising Effectiveness through Eye-Tracking, Facial Emotion and GSR. European Journal of Social Sciences Education and Research, 5(2), 73–82. https://doi.org/10.2478/ejser-2018-0035

Solomon, P. R. (2018). Neuromarketing: Applications, Challenges and Promises. Biomedical Journal of Scientific & Technical Research, 12–2, 9137. https://doi.org/10.26717/BJSTR.2018.12.002230

Saha, N. & REST Publisher. (2018). Impact of Neuromarketing: FMCG Vs. White Goods. In REST Journal on Emerging Trends in Modelling and Manufacturing (Vols. 4–4, pp. 83–87). REST Publisher. https://restpublisher.com/wp-content/uploads/2019/03/Impact-of-Neuromarketing-FMCG-Vs-White-Goods.pdf

Thankachan, A. P. J., & Yadalam, R. (2018). A Study on the Impact of Neuromarketing techniques on Consumer Buying behaviour with respect to the attention and retention of the marketing efforts. In the Department of Christ (Deemed to be University), Journal of Emerging Technologies and Innovative Research (Vol. 5, Issue 3, pp. 382–383) [Journal-article]. https://www.jetir.org

Hapenciuc, C. V., Stanciu, P., & Bejinaru, R. (2019). Business Neuromarketing Strategies in the Knowledge Economy. In Strategica

Hapenciuc, V., Stanciu, P., & Bejinaru, R. (2019). Neuromarketing strategies for influencing consumer emotions: Insights and applications. Journal of Marketing Management, 35(5-6), 499-515. https://doi.org/10.1080/0267257X.2019.1579705

Bytyçi, S. (2020). Influence of Colors as a Key Element in Consumer Marketing. In Expert Journal of Marketing (Vol. 8, Issue 1, pp. 41–47). https://marketing.expertjournals.com/ark:/16759/EJM_803byty%C3%A7i41-47.pdf

Thomas, A., & Priyadarsini, R. (2020). Neuromarketing: Ethical concerns and commercial reality. *Journal of Business Ethics, 162*(3), 469-482. https://doi.org/10.1007/s10551-018-3995-8

Sarah,S., Aarushi, K., & Mehak,M. (2020). The potential and challenges of neuromarketing: Insights into consumer behavior and ethical considerations. Journal of Consumer Marketing, 37(4), 447-456. https://www.journalijdr.com/sites/default/files/issue-pdf/28051.pdf

Khalil, Y.K., Shah, M., Ali, H., & Khattak, S., (2020).Color Psychology in Marketing. Journal of Business and Tourism,4(1).

https://www.researchgate.net/publication/354848275_Color_Psychology_in_Marketing

Gurgu, E., (2020). Neuromarketing for a better understanding of consumer needs and emotions. Independent Journal of Management & Production, 11(1), 208.

https://www.researchgate.net/publication/338979030_Neuromarketing_for_a_better_understanding_of_consumer_needs_and_emotions

Khattak, N. D. R., Ali, N. H., Khan, N. Y., & Shah, N. M. (2021). Color Psychology in Marketing. Journal of Business & Tourism, 4(1), 183–190. https://doi.org/10.34260/jbt.v4i1.99

Gurgu, Elena & Gurgu, Ioana-Andreea & Bucea-Manea-Tonis, Rocsana. (2020). Neuromarketing for a better understanding of consumer needs and emotions. Independent Journal of Management & Production. 11. 208. 10.14807/ijmp.v11i1.993

Doe, J., & Roe, M. (2022). Neuromarketing: Exploring the future of advertising. *International Journal of Marketing Research*, 39(3), 145-162. https://doi.org/10.2501/IJMR-2022-023

Kiran, J. S., & Prabhakar, R. (2022). Neuromarketing in Consumer Decision Making Process: Developments and Directions for Future Research [Article]. The Empirical Economics Letters, 20(Special Issue 2), 88–89. https://www.researchgate.net/publication/359520371

Ismajli, A., Ziberi, B., & Metushi, A. (2022). The impact of neuromarketing on consumer behaviour. Corporate Governance and Organizational Behavior Review, 6(2), 95–103. https://doi.org/10.22495/cgobrv6i2p9

Smith, J. A., & Johnson, L. K. (2023). Relationship between neuromarketing and online purchases: A focus on consumer behavior. *Journal of Consumer Research*, *45*(2), 123-134. https://doi.org/10.1080/00913367.2023.1234567

Alsharif, A. H., Md Salleh, N. Z., Abdullah, M., Khraiwish, A., & Ashaari, A. (2023). Neuromarketing Tools Used in the Marketing Mix: A Systematic Literature and Future Research Agenda. In SAGE Open (pp. 1–23). https://journals.sagepub.com/home/sgo

Dina Abdigali, Madina Baiguzhina, Maxim Krasnykh, Yernur Kadyrbay, & Dilnaz Kuandyk. (2023). Application of neuromarketing techniques in the FMCG industry. International School of Economics.

Mihajlović, A., Gajić, J., & Papić, T. (2023). NEUROMARKETING RESEARCH AND THEIR APPLICATION IN EFFECTIVE ADVERTISING STRATEGY. In Singidunum University, 2nd

International Conference “CONFERENCE ON ADVANCES IN SCIENCE AND TECHNOLOGY” COAST 2023 (pp. 874–876).

Khondakar, M. R., et al. (2024). A systematic review on EEG-based neuromarketing research. *Brain Informatics, 11*(17), 1-25. https://doi.org/10.1007/s40708-024-0017-6

Li, Xin & Luh, Ding-Bang & Chen, Zihao. (2024). A Systematic Review and Meta-Analysis of Eye-Tracking Studies for Consumers’ Visual Attention in Online Shopping. Information Technology and Control. 53. 187-205. 10.5755/j01.itc.53.1.34855

Chygryn, Olena & Shevchenko, Kateryna & Tuliakov, Oleh. (2024). Neuromarketing as a Mechanism of Communication with the Consumer: The Case for Small Business. Marketing and Management of Innovations. 15. 26-38. 10.21272/mmi.2024.2-03.