



Investigating and Explaining the Roles of Neuromarketing Components in Improving Consumer Buying Behavior in Large Retail Stores

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Abstract: Neuromarketing is an interdisciplinary and emerging study that helps to better understand brain function and thus improves marketing and sales operations. The present study aimed to explain the roles of neuromarketing in improving consumer buying behavior in large retail stores. The statistical population consisted of customers in large retail stores of Shiraz. Due to the unknown number of the statistical population, the sample size was obtained to be 385 according to Cochran's formula for unknown societies. Data collection was performed using desk and field studies, and the questionnaires were used to collect data. The data analysis was performed by confirmatory factor analysis (CFA) and structural equations modeling (SEM) using SPSS and AMOSE. According to the research results, neuromarketing and its tools, including the use of customer's senses, customer satisfaction, evoking customer loyalty, considering the customer's unconscious mind, as well as the customer's logical intelligence, and customer memory significantly affected consumer buying behavior in retail stores.

Keywords: Neuromarketing; Consumer Behavior; Retail Stores.

1. Introduction and problem statement

Neuromarketing is an important branch of marketing science. Marketing aims to attract customers by affecting people. Understanding the effects of characteristics of human behaviors can be effective in achieving this goal. Increasing the use of neuromarketing techniques to evaluate customer preferences and decision-making processes simultaneously is an advantage for both customers and marketers. The term was first introduced by Nobel laureate, El Smith in 2002. Neuromarketing science indicates how the brain is affected by commercial advertising. Brain activity due to exposure to advertising is measured by neuroimaging techniques to assess this effectiveness. (Liborand, 2015)

Neural marketing is a new method in marketing in which consumer behavioral studies are related to neuroscience and the aim is to apply the technique of identifying brain mechanisms to understand customer behavior to improve marketing strategies (Calferno et al., 2017). In fact, neural marketing is one of the interdisciplinary and emerging studies that helps to better understand the function of the brain and thus improves marketing and sales operations (Tulaei, 2015). This marketing approach is based on the assumption that various factors of the brain are involved in shopping. The need to study customers' cognitive-motor-sensory responses to the stimuli presented in the market is essential (Cutler et al., 2011). Neural marketing helps professional marketers use neuroscience to understand the subconscious motivations that help consumers make decisions and actions. Neural marketing provides marketers with the opportunity to understand the principles and basis of decision-making mechanisms to a level. To reach beyond the consumer knowledge and to make a buying decision by focusing on the subconscious part of people's thoughts, emotions and feelings (Lee et al., 2017). The development of consumer behavior studies is the result of the shift of marketing philosophy from the tendency of production and product to the tendency of sales and then the tendency of marketing. Other factors involved in the development of consumer behavior studies include the rapid introduction of new products, shorter product life cycles, increased consumer advocacy movements by private groups and public policymakers, attention to the environment, and marketing growth. Services. In such an environment, having a correct understanding of consumers and the consumption process, has several advantages (Cutler, 2011).

The ultimate goal of neural marketing is to examine how consumer behavior is shaped, the process of identifying the factors that determine customer preferences, and how to choose different brands. Therefore, it seems that due to the high volume of advertising in the media, neuroscience can be a vital tool for those organizations that want to better understand their consumers and design appropriate products (illusion Et al., 2011). Therefore, because neural marketing helps to understand human decisions and introduces a new dimension to experts to institutionalize new concepts and new achievements, in the present study, researchers



are trying to answer the main question: What is the impact of neural marketing components on consumer buying behavior in large retail stores?

2. Theoretical foundations of research

2-1. Neural Marketing Definitions and Concepts

Marketing is a key component of any business today. Concepts and methods of marketing are changing and improving in proportion to the development and expansion of businesses and technology. Falls. In recent years, we have witnessed significant growth in the scientific ability of neuroscientists. The integration of psychological and physiological sciences has led to the application of techniques for amazing advances in understanding the activities of the brain and recognizing its various parts (Kenning et al., 2005). Neuromarketing is a new and emerging discipline that links consumer behavior to neuroscience. The concept of neural marketing was first coined by psychologists at Harvard University in 1990. In fact, with the beginning of the 1990s, with the help of the simulation technique of two American and British physicians named Paul Alterber and Peter Mansfield, the concepts of neural marketing became key (Akbari, 2013)

The use of neural marketing methods goes beyond traditional methods such as focus groups, questionnaires and interviews. Because the purpose of this method is to reach the minds of customers. Today, organizations have gone a step further and want to discover the motivations and intentions that lead to human behavior (Akbari, 2013). The technology of the neural marketing model is based on the concept that a large part of human activity thinking (more than 0.90), including emotions, occurs in the subconscious area of the brain, which is below the level of human consciousness. Therefore, learning effective manipulation processes in the subconscious part of the brain has always been of interest to marketers (McDaniel, 2015).

There are many definitions of neural marketing, but in general, market research and marketing activities that use methods and techniques related to neuroscience are called neural marketing. Neural marketing solves similar problems that are the main goal of all marketing research; For example, how and to what extent a company should spend budget for marketing and advertising that can simultaneously generate revenue and increase profits for investors (Bayan et al., 2014). Antonio Damasio believed that in addition to the logical parts of the brain, humans also use emotional parts in decision making. Nowadays, researchers using FRI (brain scanning technology) technology have shown that when the "shopping" area in the brain begins to function (neural activity increases in the brain's response to the shopping stimulus), these areas become more sources of blood. To support their reactions. Research confirms that in neural retrieval, the prefrontal cortex is the critical part of the brain in purchasing decisions. This cortex, located in front of the brain, is the area that relates to a person's preferences and feelings, and product-related images are processed in this area, increasing the likelihood that consumers will buy. Thus, if advertisers can identify product images that elicit a response in the middle cortex of the front of the brain, they will be able to boost their sales (Velasco et al., 2014).

2-2. Dimensions of defiant marketing Neural

Marketing is a new branch of marketing science based on modern techniques in the field of neuroscience and using neural imaging techniques to understand human behavior in relation to the market and marketing exchanges using a specific cortical response of the brain, fromIt seeks to better identify and understand the brain mechanisms of the consumer in order to increase the business efficiency of the organization.The following is a brief description of each dimension of neural marketing in Table (1):

Table 1. Dimensions of neural marketing

Summary description	Dimensions
The five senses affect the consumer's perception.Cognition and perception change the attitude of learning and lead to behavior (decision to buy) in the consumer (Haghighi et al., 2017: 65).	Customer Senses
It refers to all marketing strategies and behaviors that are done in order to create psychological well-being of consumption by the stores under review (Negarandeh, 2018).	Satisfy the customer
It is defined as the commitment of the customer to do business with a particular organization and to purchase goods and services frequently (Hsu et al., 2006).	Costumer loyalty
Refers to a person's ability to recall information about his or her previous experiences.Memory includes the processes of obtaining, recording or encrypting, storing, and finally retrieving information.	Memory
The subconscious mind contains a set of information that cannot be accessed, such as childhood memories (Khairabadi&Khairabadi, 2017).	Acceptance of the customer's



	subconscious mind
Adaptive behavior of the individual, which usually has an element of problem solving and is guided by practical processes and cognitive operations (Seif, 2011).	Customer logical intelligence

2-3. Nervous marketing and consumer behavior

Today, the marketing axis is based on customer satisfaction. This approach introduces new concepts related to the market and changes the rules of the game in the sale of products and services. Therefore, companies and organizations must properly identify and understand the needs, tastes and expectations of their customers so that they can produce products with maximum value to the consumer, and effectively price, distribute and promote it (Sutherland and Sylvester, 2009). Because getting a deep customer relationship is not easy for brands. There are brands that customers trust and there are brands that customers love. Brand policy to influence the emotions and motivations of customers is an important cognitive process that takes cognitive science seriously into marketing issues (Schmidt et al., 2001). Nowadays, researchers have come to the conclusion that building trust and loyalty in customers is not achieved simply by creating superiority and differentiation for customers, and only by providing personal preferences, they cannot be forced to love, loyalty and trust the customer. (Hollywood et al., 2007). Because as long as a person's inner values and goals are damaged in a situation; The human brain is more concerned, and these core values are directly related to the most powerful motivator in the human brain. The left hemisphere of the human brain is involved with emotions and understands them well (Ares et al., 2010). That is why sober companies are researching the process of deciding to buy their product category. Armstrong (2011) believes that marketing stimuli, along with other stimuli, enter the consumer black box and cause reactions in the black box. The black box itself consists of two parts. The first part is the individual characteristics of the buyer that affect how he perceives and reacts to the stimulus, and the second part is the buyer's decision-making process that affects his behavior. Marketers want to know how a stimulus in a consumer black box turns into a reaction.

One or two of the listed systems would be an incomplete description of the customer. An important point of the Cutler and Armstrong model is that customers need access to information to make purchasing decisions (Terpestra et al., 2014). The steps that consumers go through when making a decision are:

- 1) Recognize the problem: At this stage, consumers identify what they need. If the need is strong enough, it may motivate one to enter the second stage;
- 2) Search for information: Information may be extensive or limited depending on the level of consumer mental involvement.
- 3) Evaluate alternatives: At this stage, consumers evaluate the alternatives identified to solve the problem. This stage leads to the formation of beliefs and attitudes about alternatives;
- 4) Selection and acquisition: This step includes deciding on the choice of alternative activity (choosing which brand, spending or saving, buying the product from which store);
- 5) Consumption and use: At this stage, consumers will pay for what has been acquired plus their results

2-4. Experimental research literature

In a 2020 paper entitled "Neuromarketing, the New Science of Consumer Behavior," Christoph Maureen found that conventional methods for testing and predicting the effectiveness of those investments generally failed because they depended on consumer satisfaction and competence. Explain how it depends when they encounter an ad. Neuromarketing suggests ways to explore brains directly without the need for cognitive demand with informed participation. The discussions in this study promise to start the growth of the field of neuromarketing and suggest that neuromarketing offers the potential to significantly improve the effectiveness of business messages related to the cause of advertising worldwide. Aslai et al. (2019), in a study entitled Analytical Approach to Neuromarketing as a 20 Business Strategies, concluded that the design of business strategies requires theoretical and methodological approaches to neuromarketing to know what consumer reactions to What is brain activation without the need to request a report of their conscious experience, and consequently our company is able to develop valuable capacities and resources to create central strategies.

walson (2018), in a study entitled Neuromarketing and evaluation of consumer emotional and cognitive responses to marketing stimuli, found that neuromarketing will be able to assess a superior level of knowledge in consumer behavior. They are the basis for understanding the consumer response to different and varied market stimuli. This approach is presented according to its concept as any path that is assigned in the literature. According to the decision-making process can activate a variety of external areas, which becomes a difficult method. Yoon et al. (2012), in a study entitled Decision Making in Neuroscience and Consumer Behavior, examined the impact of neuroscience on customer preferences and decisions using biological and physiological mechanisms, and finally the impact of neuroscience on Makes the final decision of the consumer. Parsons



(2013), in a study entitled Consumer Mind: Brand Perception and Its Concepts for Marketers, found that it examines neural marketing and its techniques in advertising and its relationship to memory and communication and emotion, as well as evaluating the impact. Remembers brands and brand slogans.

Akbari (2019) in his article entitled "Study of neuromarketing tools" has concluded that one of the most important issues in consumer motivation is understanding how consumers make decisions, which is always the focus of researchers, marketers and industry managers. After the frustration of traditional methods, new and combined methods such as neural marketing have been developed. Neural marketing is the result of merging the two disciplines of neuroscience and marketing. Dehghanpour et al. (2016) found a study entitled "Study of the effect of sports brand advertising on changes in electroencephalographic graphics of customers in neural marketing", found that the average frequency activity of delta, theta, alpha and beta in all four groups before, during and after viewing ads Was different; Therefore, by creating a comprehensive and better consumer environment and developing basic knowledge in this field, it is possible to facilitate the realization and achievement of advertising goals in the sports sector in the country. Eivazi (2016) acknowledged a study entitled "Designing the Effectiveness of Shape and Color in Advertising on Customer Decision Making Using Neural Marketing Approach", from 5 electrical brain waves, delta waves and theta advertising images with none of the age variables. There is no significant relationship between gender, superiority, personality traits and decision-making styles. The overall results of the research show that customers prefer round shapes with warm colors to sharp shapes as well as cold shapes. Akbari (2013), in a study entitled Review of neural marketing and its applications, while drawing a clear and comprehensive picture of neural marketing and also showing the practical and experimental aspects of neural marketing tools.

A better understanding of neural marketing may increase our knowledge of basic concepts with marketing and management.

3. Research methodology

This research is quantitative in nature and field type. The statistical population of the present study includes the clients and customers of large retail stores in Shiraz. Due to the unknown volume of the population, Cochran's formula was used for sampling for unknown communities and the sample size was 385 people. It was done randomly. The method of data collection is a combination of library and field methods and the data collection tool is a questionnaire based on a 5-point Likert scale. Validation of this study was confirmed by content validation method and its reliability was confirmed by using Cronbach's alpha coefficient equal to 0.83. Data analysis was performed first descriptively and then inferentially. In order to model the structural equations, in order to fit the model and the relationships between the variables while testing the relationships between the research variables, SPSS software was used to Amos.

4. Research findings

According to the existing variables of age distribution, gender, history of activity in the study area, as well as the frequency of answers to the questions and research variables in the descriptive section is presented.

Table 2. Demographic variables of the research

Frequency	Abundance	Variables	
0/46	178	Man	Gender
0/54	196	Female	
0/23	89	Between 20 and 30 years	age
0/236	91	Between 31 and 40 years	
0/276	103	Between 41 and 50 years	
0//197	76	Between 51 and 60 years	
0/026	26	More than 60 years	
0/6	231	Married	marital status
0/4	154	Single	
0/262	101	Diploma and sub-diploma	education
0/080	34	Associate	
0/457	176	Masters	
0/192	74	Master and above	



4-1. Confirmatory factor analysis

Before using the factor analysis method, it should be ensured that the sample size is sufficient for factor analysis. One of the methods for examining sample adequacy for factor analysis is to calculate the sample adequacy index. The sample adequacy index has been innovated by Kaiser, Meyer and Olkin and is therefore represented by the KMO symbol. The KMO index value should be above 0.7, but between 0.5 and 0.7 is also acceptable with caution. Table (3) shows the results of the KMO and Bartlett tests.

Table 3. KMO and Bartlett test values

0/871	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	
281/234	Approx. Chi-Square	Bartlett's Test of Sphericity 281/239
987	df	
0/000	Sig.	

Therefore, considering that the value of KMO statistic is equal to 0.871 and shows that the data of this scale are suitable for factor analysis and the existing sample seems to be sufficient for factor analysis. The results of Bartlett sphericity test are also significant, ie there is a significant correlation between the variables.

4-2. Model analysis and fitting

In order to analyze the path and the effect of independent variables on the research dependent in the Amos software environment, the path analysis test was used. Regression effect coefficients show the effect of the independent variable and its role in explaining the dependent variable. If the significance level is less than 0.05 and the CR level is more than 1.96, the impact rate is significant.

Table 4. Fit indicators of path analysis model the impact of neural marketing dimensions on sales growth

The value obtained	Limit	Indicator
2.012	Less than 3	Xi du on the degree of freedom
0.162	Less than 0.08	RMSEA (root mean square estimation error)
0.916	Above 0.9	TLI (Tucker Lewis Index)
0.911	Above 0.9	CFI (Adaptive Fit Index)
0.936	Above 0.9	RFI (Relative Fit Index)
0.892	Above 0.9	IFI (Incremental Fit Index)
0.811	Above 0.9	NFI (BentlerBount Fit Index)
165	Less than the number of samples analyzed	HOELTER (Critical Sample Volume Index)

Table 5. Standard and non-standard regression path coefficient test output

Significant test value of path P	Critical ratio of C.R.	The standard deviation	Non-standard parameter	Standard parameter	Direction		
					Consumer behavior	<---	Customer Senses
***	4.080	.232	.411	1.003	Consumer behavior	<---	Customer Senses
***	3.830	.112	.520	1.821	Consumer behavior	<---	Customer satisfaction
***	4.736	.201	.384	.762	Consumer behavior	<---	Customer loyalty
.160	1.406	.046	.057	.064	Consumer behavior	<---	Customer memory
***	3.746	.218	.415	1.632	Consumer behavior	<---	Unconscious
***	4.932	.110	.537	1.728	Consumer behavior	<---	Logical intelligence



4-3. Test of research hypotheses

The hypothesis was analyzed using regression test. The main and necessary results for reporting this test are related to regression analysis to show the effect of the independent variable on the dependent in the form of a model with an independent variable in Table (6).

Table 6. Summary of regression analysis of the effect of neural marketing variables on consumer behavior

Beta	B	The significance level	F	The coefficient of determination	Multiple correlation coefficient	Model
.196	.205	.000 ^b	15.200	.036	.196 ^a	Customer senses on consumer behavior
.572	1.105	.000 ^b	185.429	.325	.572 ^a	Customer satisfaction on consumer behavior
.318	.316	.000 ^b	0/117	0/123	.318 ^a	Customer loyalty on consumer behavior
.019	.021	.000 ^b	0/131	0/113	.019 ^a	Customer memory on consumer behavior
.359	1.746	.000 ^b	12/389	0/137	.359 ^a	Customer subconscious mind on consumer behavior
.496	1.654	.000 ^b	0/53245	0/121	.496 ^a	Logical intelligence on consumer behavior

5. Conclusions and suggestions

Neural marketing is a new branch of marketing science that is based on modern techniques in the field of neuroscience. The present study was conducted to identify the impact of neural marketing components on consumer buying behavior. The results show that customer senses have a significant effect on consumer buying behavior and explain 32.5% of the changes in this variable. Accordingly, it seems that persuading customers should be on the agenda of marketers. The results of the present study are in line with the results of Shabgoo and Mirzaei Daryae (2014) research on the effect of five senses stimulation on customer behavior. Customer satisfaction as one of the dimensions of neural marketing has been another variable whose impact on consumer buying behavior has been investigated. The results reported in the present study are in line with the findings of Shen Yin (2014) who concluded that satisfaction with the quality of information and quality services for customers is an important relationship. Another research variable whose effect on increasing sales has been tested is the effect of customer loyalty using neural marketing methods. The results have shown that this variable also significantly explains the changes in consumer buying behavior. . Another variable whose impact on consumer buying behavior has been studied is customer memory. This finding also significantly explains the variable changes in consumer buying behavior.

Customer subconscious mind was another variable whose effect on consumer behavior was measured. The results of the present study show that changes in this variable have a more significant effect on consumer behavior. Rational customer intelligence is another variable whose effect on consumer behavior has been considered and tested. In the present study, the reported results show that logical intelligence significantly explains the changes in the sales variable well. In the following, according to the research results, the following practical suggestions are presented: Continuous evaluation of the selected marketing strategy to identify strengths and weaknesses and improve the marketing process; Appropriate use of neural marketing based on ethical principles for consumers; Shaping consumer attitudes by managing ad content based on the five senses of customers; Further use of ergonomics in the field of neural marketing activities; Holding more diverse competitions and entertaining valuable prizes or holding special discount festivals for holidays and seasons, etc .; Repeat the ideal advertising at the right time; Giving customers enough information about products.



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