

THE IMPACT OF NEUROMARKETING STIMULI ON CONSUMER PURCHASE DECISIONS: THE MEDIATING ROLE OF EMOTIONAL RESPONSE

Shuja Uddin

Research Scholar, Greenwich University Karachi. Email: Shujasoomro15158@gmail.com

Dr. Muhammad Mujtaba

Faculty, Shaheed Zulifqar Ali Bhutto Institute of Science and Technology, University
Karachi, Pakistan- Email: smmujtaba14@gmail.com

Saifullah Shakir

Faculty, Department of Business Administration Sindh Institute of Management and
Technology Karachi, Pakistan- E-mail: saifullahphd@gmail.com

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Corresponding Author: *

Shuja Uddin

Abstract

Neuromarketing has become a new marketing technique that allows companies to gain insight into consumers' behaviors by tapping into their senses and emotions. Though the field of neuromarketing is increasingly gaining attention, there is little empirical evidence on the mechanism by which neuromarketing stimuli impact consumer buying decisions in emerging markets like Pakistan. This study uses the Stimulus – Organism – Response theory as a basis for understanding how the stimulation of neuromarketing affects the purchasing decisions of consumers, where the intervening variable is the response of the emotions in the form of feelings. This study used a quantitative cross-sectional research design, and a structured questionnaire was used to gather data from 425 consumers in Pakistan. Structural equation modeling (SEM) was used to analyze the proposed relationship. The results indicate that neuromarketing stimuli have a strong positive impact on consumers' emotional responses and purchases. In addition, there is a strong interaction between the emotional response and the relationship between the neuromarketing stimuli and consumer purchase decision, which shows that the influence of marketing stimuli on purchasing behavior is mainly through inducing a positive emotional response. The findings add to the neuromarketing literature by offering empirical support for a developing economy and the explanatory power of the S–O–R framework in understanding consumer decision making. The study also has practical applications for marketers, retailers, and brand managers as it emphasizes the need to craft marketing campaigns with all the elements designed with an emotional



appeal, which also includes effective use of visual, auditory, and sensory aspects to improve consumer purchasing behavior. The study adds to the existing marketing literature by showcasing the potential of neuromarketing methods to boost consumer involvement and enhance marketing performance in the dynamic and competitive retail market in Pakistan.

Keywords: Neuromarketing Stimuli, Consumer Purchase Decisions, Emotional Response, Stimulus–Organism–Response Theory, Consumer Behavior, Pakistan.

1. Introduction

Consumer Purchase Decisions is a primary focus in marketing. Consumers are inundated with packaging, commercials, colors, tones, digital screens, stores, and discounts. While buying is considered a rational process, attention, memory, product evaluation, and approach behaviour are also influenced by sensory, emotional, automatic, and subconscious reactions (Achar et al., 2016; Krishna, 2012; Plassmann et al., 2015).

These automatic reactions may not be adequately captured by traditional methods, such as surveys, interviews, or focus groups, because consumers often don't understand how the processes that drive their purchasing decisions operate. Neuromarketing addresses this limitation by integrating neuroscience, psychology, behavioral decision-making, and marketing to examine responses to cues in the marketplace (Lee et al., 2007; Morin, 2011). EEG, eye-tracking, facial expression analysis, galvanic skin response, and functional magnetic resonance imaging (fMRI) measure attention, arousal, emotion, memory, and preference (Ariely & Berns, 2010; Rawnauque et al., 2020). But

the findings need to be considered in the context of existing theories about consumer behaviour (Byrne et al., 2022; Khondakar et al., 2024).

Neuromarketing insights can be applied by an organization without expensive neurological equipment. Colour, image, music, packaging, product placement, sensory atmosphere, messages of scarcity, personalised content, and brand narratives can all get attention and invoke emotion (Krishna, 2012; Morin, 2011). Neuromarketing stimuli are not actual, physical neurological signals but rather the consumers' perception of visual, auditory, sensory, and psychologically stimulating stimuli. This method allows for the analysis of larger samples of consumers and real-life shopping situations, but can lead to cognitive overload when the stimuli are too intense, with unintended consequences (Juárez-Varón et al., 2023).

Emotions offer a rich account of the impact such cues have on purchasing behavior. The pleasure, excitement, curiosity, attachment, fear, and urgency created by advertising, product presentation, websites, and retail



environments affect product evaluation, brand preference, memory, perceived value, and willingness to purchase (Achar et al., 2016; Holbrook & Batra, 1987). Emotional response could be the mechanism linking neuromarketing cues and purchase decisions, as the same stimulus can elicit different responses from consumers.

This relationship has a theoretical foundation in the Stimulus – Organism – Response theory. It suggests that stimuli in the external environment have an impact on internal cognition and emotion, which in turn lead to approach or avoidance behaviours (Mehrabian & Russell, 1974). The present model sees neuromarketing cues as the stimulus, emotional response as the organism, and purchase decisions as the behavioural response (Donovan & Rossiter, 1982; Eroglu et al., 2001). This mediation mechanism is also supported by the findings of studies that confirm how business reputation, environmental factors, and intellectual capital help mediate the impact of resources and technologies on business performance outcomes (Anser et al., 2024, 2025; Naeem et al., 2024a).

Despite the increased interest, neuromarketing research is limited to neurological instruments, laboratory research, direct effects, and developed economies. The perceived exposure to the cues that are embedded in neuromarketing (NM) and the emotional response as an intervening factor have received little attention so far in the context of routine buying scenarios

(Byrne et al., 2022; Rawnaque et al., 2020). The space is especially significant in Pakistan because traditional retail is moving into the realm of social-media advertising, mobile commerce, influencer communication, digital video, fintech, and personalized platforms. This reveals that relationships can be formed, defined, and influenced by institutional, cultural, technological, and socioeconomic conditions in the emerging markets (Ali et al., 2022; Farooq & Ahmad, 2023; Farooq et al., 2023).

The aim of this research is therefore to investigate the relationship between neuromarketing stimuli and emotional response, whether there is a relationship between emotional response and purchase, and whether emotional response is a mediating factor in the relationship between neuromarketing stimuli and purchase. It contributes by establishing the relationship among the three constructs that is S–O–R, linking the psychological process of emotion between the marketing cues and the behavior of consumers, and using evidence from Pakistan. The results could also help marketers to create culturally appropriate, emotionally resonant, and ethically sound consumer experiences (Stanton et al., 2017).

2. Literature Review and Hypothesis Development

2.1 Neuromarketing

Neuromarketing combines disciplines such as marketing, advertising, psychology, and neuroscience to understand how consumers think, feel, and react to products, brands, advertising,



pricing, packaging, and experiences in the marketplace. It combines neuroscience, psychology, behavioral economics, and marketing with the traditional research methods used with consumers (Lee et al., 2007; Morin, 2011; Plassmann et al., 2012). Commercial neuromarketing uses neurological and/or biometric methods to address real-world marketing challenges, while academic consumer neuroscience aims to construct theoretical models of consumer behavior (Plassmann et al., 2012).

2.2 Emotional Response

Emotional response is the affective state that is created when a marketing stimulus is understood by the consumers. Valence and intensity of emotions differ and can be either pleasurable, exciting, comforting, curious, attached, anxious, irritated, urgent, or anticipated regret (Achar et al., 2016; Holbrook & Batra, 1987). According to Mehrabian and Russell (1974), the emotional experience consists of three dimensions: pleasure, arousal, and dominance. Pleasure is defined as happiness, satisfaction, or comfort; arousal is defined as excitement and psychological activation; and dominance is defined as perceived control. These dimensions have been extensively used for retail atmospheres, advertising, the setting of service, and digital environments (Donovan & Rossiter, 1982; Eroglu et al., 2001).

2.3 Consumer Purchase Decisions

Consumer purchase decision comes after the process of evaluation of products or services and is the determination of what, when, where, and how much to purchase.

It is determined by product attributes, price, perceived value, brand familiarity, social influence, prior experience, risk, availability, convenience, and marketing communication (Dodds et al., 1991). Purchase decisions are correlated with purchase intentions, but not a direct measure of intentions. Intention indicates willingness or probability of purchase, while purchase decision indicates action towards making a purchase. It is possible that, despite good intentions, products will not be purchased or that purchasing will not occur, due to financial, product, or social factors or changing preferences.

2.4 Stimulus–Organism–Response Theory

The Stimulus–Organism–Response model is used to understand the relationship between external stimuli and internal psychological responses and consequent behaviors. Mehrabian and Russell (1974) suggested that the environmental stimuli influence pleasure, arousal, and dominance, and that this leads to approach or avoidance responses. Donovan and Rossiter (1982) adapted the model for use in retail stores, and Eroglu et al. (2001) expanded the model to online stores.

The model consists of three elements:

Stimulus: External environmental cues;

Organism: Internal cognitive or emotional processes; and

Response: Resulting behavioral outcomes.

The stimulus in this study is the visual, auditory, sensory, and psychologically appealing marketing stimuli. The organism is pleasure/ excitement/ interest/ emotional involvement. Product preference and product choice are the



answers. The framework acknowledges that the same cue does not elicit the same response from all consumers. The impact of an ad or display is related to the emotional lens through which it is viewed. So, emotional response is one such variable that should account for some of the links between the neuromarketing stimulus and the decision to purchase.

This focus on mediation is in line with the growing body of research in the emerging markets. It has been revealed that business reputation has mediated the relationship between green intellectual capital and performance, external environmental factors have linked AI with environmental performance, and intellectual capital has connected AI investment with firm value (Anser et al., 2024, 2025; Naeem et al., 2024a). Additionally, several moderating factors have been identified in other studies, such as digital transformation, psychological empowerment, corporate reputation, green innovation, and green HRM (Mujtaba et al., 2025a; Naeem et al., 2025a, 2026a; Sial et al., 2025). While these studies are centred on organizational results, they show the benefits of elucidating the interrelationship between one thing and another. The current research extends this reasoning at the consumer level and posits emotional response as the link between the stimuli of the neuromarketing and purchase decisions.

3. Hypothesis Development

3.1 Neuromarketing Stimuli and Emotional Response

Neuromarketing cues like colours, images, sounds, scents, packaging, digital interfaces, and emotional messaging aim to capture attention and evoke affective activation (Krishna, 2012; Morin, 2011). Some cues can be pleasant, exciting, familiar, and interesting, while too much or too little and inconsistent cues can lead to confusion, irritation, and overload. Visual elements pull attention and impact product evaluation, music and voices draw the mood, arousal, and memory, scent impacts mood, texture impacts memory, and ambience impacts arousal and memory. (Krishna, 2012) Advertisements, packaging, pricing, and retail environments have been found to cause measurable differences in attention, emotional evaluation, memory, and preference in systematic reviews (Byrne et al., 2022; Khondakar et al., 2024; Rawnaque et al., 2020). In a similar vein, Juárez-Varón et al. (2023) reported that retail cues influenced emotional processing, yet excessive stimulation resulted in a decrease in attention. In line with the S-O-R theory, a successful marketing stimulus should evoke more positive emotions that are visually appealing and sensory.

H1: Neuromarketing stimuli have a significant positive effect on consumers' emotional responses.

3.2 Emotional Response and Consumer Purchase Decisions

An emotional response towards a product determines whether it is approached or avoided by the consumer. Positive emotions can enhance the brand association, liking for the product,



perceived value, and motivating action. Feeling excited can make the choice process urgent, and feeling pleased or comfortable can enhance confidence in the choice process (Achar et al., 2016; Mehrabian & Russell, 1974). Holbrook and Batra (1987) demonstrated the role of emotional responses in the explanation of advertising effects, and Achar et al. (2016) suggested that emotions are involved in the appraisal process of consumer decision-making. Irritation, anxiety, distrust, and poor emotional experiences can reduce purchasing, while positive emotional experiences can boost attention and memory. Based on behavioral research, it can be concluded that external conditions can be transmitted to the results through internal psychological states (Mujtaba et al., 2025a). In turn, consumers who are happy, interested, or emotionally engaged tend to be more likely to buy the advertised product.

H2: Emotional response has a significant positive effect on consumer purchase decisions.

3.3 Neuromarketing Stimuli and Consumer Purchase Decisions

Neuromarketing stimuli can have a direct impact on the decision to purchase by boosting product recognition, salience, recall, and differentiation. Packaging, music, imagery, price cues, displays, and/or the design of the interfaces can make it easier to compare and make one option more prominent than competing options (Krishna, 2012; Plassmann et al., 2015). Many studies have found that the effects of advertising, design, color, price,

packaging, and sensory atmosphere on attention, preference, and purchase-related responses have been observed (Dodds et al., 1991; Juárez-Varón et al., 2023; Krishna, 2012). Neurological research also links outcomes of purchases to attention, memory, emotional appraisal, and approach motivation (Byrne et al., 2022; Plassmann et al., 2012). With the rise of AI-powered ads, tailored web interfaces, and digital recommendations in Pakistan, exposure to cues might grow even more (Bohio et al., 2025; Naeem et al., 2024b). These should be more likely to select the promoted product if consumers perceive them as relevant, memorable, and engaging.

H3: Neuromarketing stimuli have a significant positive effect on consumer purchase decisions.

3.4 Mediating Role of Emotional Response

The S-O-R model suggests that external factors affect the behavior via internal psychological factors. The Neuromarketing cues' influence on the buying decision is not just due to their presence, but also because they elicit feelings of pleasure, excitement, curiosity, attachment, or any other emotion that is relevant to purchasing. Positive feelings have the potential to have positive effects on product evaluation, recall, perceived value, preference, and willingness to pay (Achar et al., 2016; Holbrook & Batra, 1987). When a marketing cue elicits an emotion that does not result in a noticeable change, it may have only a small impact without being noticed. This is in line with the research that confirms

that organizational resources are transferred to performance outcomes through reputation, environmental factors, intellectual capital, and digital transformation, psychological empowerment, and green innovation (Anser et al., 2024, 2025; Mujtaba et al., 2025b; Naeem et al., 2024a, 2025a, 2026a; Samo et al., 2026; Sial et al., 2025). With both direct and indirect effects, there is

3.5 Conceptual Framework

The conceptual framework is given below in Figure I.

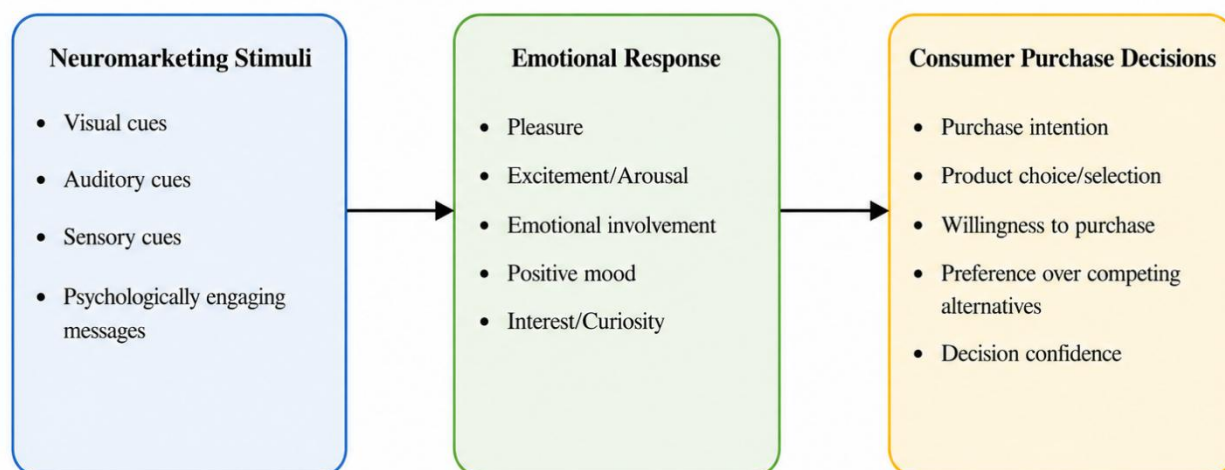


Figure I

4. Research Methodology

4.1 Research Philosophy and Approach

This study used a positivist research philosophy as it focused on the relationship between constructs that could be measured and were theoretically derived. The Stimulus–Organism–Response theory and literature in the field of neuromarketing were used to develop and test hypotheses in a deductive approach (Creswell & Creswell, 2018; Saunders et al., 2019).

4.2 Research Design

A quantitative, explanatory, and cross-sectional research design was employed.

partial mediation in emotional response. When the direct effect is nonsignificant and the indirect effect is significant, then the direct effect is considered to be mediated.

H4: Emotional response significantly mediates the relationship between neuromarketing stimuli and consumer purchase decisions.

The quantitative design enabled the statistical examination of the relationships among neuromarketing stimuli, emotional response, and consumer purchase decisions. Data were collected from respondents at a single point in time, which is consistent with a cross-sectional research design (Creswell & Creswell, 2018). Because cross-sectional data do not establish temporal precedence, the findings indicate theoretically supported associations rather than definitive causal relationships.

4.3 Target Population



The target group was adult consumers in Pakistan who purchased products or services and consumed advertisements, product packaging, promotional material, digital marketing, or retail stimuli. The respondents had to be 18 years or older.

4.4 Sampling and Sample Size

Questionnaires were sent online and sent via postal mail. 520 questionnaires were sent out. 425 questionnaires were obtained after discarding answers that were either incomplete or unsuitable for analysis, giving an acceptable response rate of around 81.7%. The final sample size of 425 respondents was deemed to be sufficient for the use of PLS-SEM for estimating the model with multiple latent constructs, direct and indirect relationships, as suggested by Hair et al. (2019).

4.5 Questionnaire Development

A structured questionnaire with two parts was used to gather data. The first part gathered demographic data, and the second part recorded neuromarketing stimuli, emotional responses, and consumer buying decisions.

Items for measuring the various components were adapted from existing literature on neuromarketing, sensory-marketing, emotional-response, and consumer-behaviour (Holbrook and Batra, 1987; Krishna, 2012; Mehrabian & Russell, 1974; Plassmann et al., 2012). A five-point Likert scale (1 = strongly disagree to 5 = strongly agree) was used to obtain a measure of response.

The questionnaire was adapted to the Pakistani context. A pilot study was first conducted with 30 respondents to test

the clarity, relevance, and reliability of the measurement items before the main data collection took place. Minor wording edits were made to reflect the feedback from the pilot-testing.

4.6 Data-Collection Procedure

The academic objective of the study was explained to the respondents before they filled out the questionnaire. Respondents were asked to participate freely, and their answers were guaranteed anonymity and confidentiality. Common method bias was minimized by using clear instructions, simple wording, anonymous responses, and separating the predictor and outcome constructs from the questionnaire (Podsakoff et al., 2003).

4.7 Data-Analysis Strategy

SmartPLS software and partial least squares structural equation modelling were used to analyze the data. The model was tested using PLS-SEM, which is suitable for predictive models with latent constructs and multiple structural relationships with a mediator (Hair et al., 2019). Indicator loadings, Cronbach's alpha, composite reliability, and average variance extracted were used to evaluate the measurement model. The Fornell-Larcker criterion and the heterotrait-monotrait ratio (Henseler et al., 2015; Fornell & Larcker, 1981) were used to test for discriminant validity. The collinearity statistics, path coefficients, coefficient of determination, effect size, predictive relevance, and statistical significance were used to assess the structural model. The direct and indirect relationships were tested using the bootstrapping method. Emotional response was seen as being a

significant mediator when the confidence interval around the indirect effect

excluded zero (Hair et al., 2019).

5. Results

5.1 Respondent Profile

The demographic characteristics of the 425 respondents are presented in Table 1.

Table 1. Demographic Profile of Respondents

Characteristic	Category	Frequency	Percentage
Gender	Male	231	54.4
	Female	194	45.6
Age	18–25 years	126	29.6
	26–35 years	158	37.2
	36–45 years	83	19.5
	46–55 years	39	9.2
	Above 55 years	19	4.5
Education	Intermediate or below	72	16.9
	Bachelor's degree	190	44.7
	Master's degree	138	32.5
	MPhil/PhD	25	5.9
Employment	Student	104	24.5
	Salaried employee	177	41.6
	Self-employed	93	21.9
	Other	51	12
Shopping frequency	Weekly	142	33.4
	Monthly	202	47.5
	Less frequently	81	19.1

The number of male and female respondents was fairly even, with a slight majority of males. The majority of the respondents were in the age range of 18–35 years, had bachelor's or master's degrees, and bought food weekly or monthly. Since a non-probability sampling technique was applied, the sample should not be considered representative of the total population of Pakistan.

5.2 Preliminary Data Screening

520 questionnaires were sent out. Ninety-five responses were eliminated due to missing information, straight-line responses, very short completion times, or response patterns that were inconsistent. Hence, 425 usable responses were retained, giving an effective response rate of 81.7%. Data for missing, outlier, norm, and multicollinearity were analyzed. The skewness values were between -1.18 and 0.74 , and the kurtosis values were between -0.83 and 1.67 . The

values suggested that there were no severe distributional issues with the data. The multivariate normality was not a requirement for PLS-SEM, but was assessed, and a lack of extreme non-normality was found. The inner variance inflation factor values were in the range 1.57 – 2.41. There was no multicollinearity as all values were below the recommended value.

5.3 Common Method Bias

Procedural and statistical techniques were used to assess common method bias. The results of Harman's single-factor test indicated that the first factor accounted for 36.8% of the total variance, which is less than the widely used criterion of 50%.

Table 2. Reliability and Convergent Validity

Construct	Item	Standardized loading	Cronbach's alpha	Composite reliability	AVE
Neuromarketing stimuli	NMS1	0.803	0.897	0.921	0.66
	NMS2	0.827			
	NMS3	0.784			
	NMS4	0.851			
	NMS5	0.816			
	NMS6	0.792			
Emotional response	ER1	0.842	0.894	0.922	0.702
	ER2	0.871			
	ER3	0.818			
	ER4	0.856			
	ER5	0.801			
Consumer purchase decisions	CPD1	0.836	0.892	0.921	0.699
	CPD2	0.864			
	CPD3	0.821			
	CPD4	0.848			
	CPD5	0.809			

Values of full-collinearity ranged from 1.57 to 2.41, which is below the conservative threshold of 3.3. The results of these tests suggest that there was minimal common method bias influencing the results of the study.

5.4 Measurement Model

Indicator loadings, Cronbach's alpha, composite reliability, and average variance extracted were used to evaluate the reflective measurement model. The overall model fit was acceptable, with a standardized root mean square residual of 0.056, a normed fit index of 0.913, and RMS_theta of 0.104. None of the measurement items were omitted due to weak loadings for the indicators.

The indicator loadings varied from 0.784 to 0.871, which is greater than the recommended loading of 0.70. Cronbach's alphas varied from 0.892 to 0.897, and composite reliabilities were between 0.921 and 0.922. The results indicate good internal consistency.

The average variance extracted values ranged from 0.660 to 0.702, which is higher than the threshold of 0.50. Hence, convergent validity was found.

5.5 Discriminant Validity

The Fornell–Larcker criterion and the heterotrait–monotrait ratio were used to evaluate discriminant validity.

Table 3. Correlations and Fornell–Larcker Criterion

Construct	Mean	SD	1	2	3
1. Neuromarketing stimuli	3.78	0.68	0.812		
2. Emotional response	3.71	0.72	0.662	0.838	
3. Consumer purchase decisions	3.84	0.66	0.628	0.692	0.836

Note: Diagonal values in bold represent the square roots of average variance extracted.

Each of the AVE was found to be larger than the correlation coefficients of the other constructs for the square root. The values for HTMT were between 0.716 and 0.804, which were lower than the recommended value of 0.85. The results of these findings supported the discriminant validity.

5.6 Structural Model and Hypothesis Testing

Table 4. Direct-Effect Hypothesis Testing

Hypothesis	Structural path	β	SE	t-value	p-value	Decision
H1	Neuromarketing stimuli → Emotional response	0.662	0.036	18.389	<0.001	Supported
H2	Emotional response → Purchase decisions	0.493	0.047	10.489	<0.001	Supported
H3	Neuromarketing stimuli → Purchase decisions	0.301	0.049	6.143	<0.001	Supported

Neuromarketing stimuli had a significant positive effect on emotional response,

The reliability and validity of the measurement model were tested first, then the structural relationship was tested using bootstrapping with 5000 resamples.

The structural model accounted for 43.8% and 53.0% of the variance in emotional response and consumer purchase decisions, respectively. The emotional response and consumer purchase decision predictive relevance values were 0.294 and 0.361, respectively, which is satisfactory.

supporting H1. This suggests that consumers had more positive emotional

responses to the visual, auditory, and sensory marketing cues that were attractive.

While completed, the emotional response was seen to have a significant positive impact on consumer purchase decisions, supporting H2. Purchasing tendencies were higher for consumers who had a

sense of pleasure, excitement, interest, and emotional involvement.

H3 was also supported by the significant direct effect of the neuromarketing stimuli on purchase decision. Hence, independent of the consumers' emotional responses, engaging marketing cues had an impact on the purchase decision.

5.7 Mediation Analysis

The mediating role of emotional response was examined through the bootstrapping procedure.

Table 5. Mediation Analysis

Indirect relationship	Indirect effect	Boot SE	Lower CI	Upper CI	p-value	Result
Neuromarketing stimuli → Emotional response → Purchase decisions	0.326	0.041	0.249	0.409	<0.001	Significant

The indirect effect of the neuromarketing stimuli on the purchase decision via emotional response was statistically significant and positive. The 95% confidence interval was (0.249, 0.409), which does not contain any zero. H4 was thus approved.

The direct effect of neuromarketing stimuli on purchase decisions did not change and stayed positive and statistically significant when emotional response was added, showing complementary partial mediation. Therefore, neuromarketing stimuli played a direct role in influencing consumers' buying decisions and indirectly through the positive emotional response they had to the stimulus.

6. Conclusion

The present study aimed to study the effect of neuromarketing stimuli on the purchasing behavior of consumers in

Pakistan and to explore the mediating effect of emotional response on consumers in Pakistan. The study was based on the Stimulus–Organism–Response theory, which posits that the external stimuli in the marketplace are the Neuromarketing Stimuli, the internal psychological response of the consumer is the Emotional Response, and the resulting behavior is the Purchase Response. The results provide evidence that the neuromarketing stimulation has a positive effect on consumers' emotional responses. Visually appealing presentations, suitable sound, sensory appeals, and emotional content in communication and the presentation of products can create pleasure, excitement, positive mood, curiosity, and emotional involvement. It also confirms emotional response as a significant (positive) factor that affects the purchase decision,



meaning that products are more likely to be chosen or purchased when marketing stimuli create positive emotions.

Neuromarketing stimuli also proved to be directly related to the purchase decision positively. This suggests that cues originating from the senses and psychologically can affect purchasing behavior by capturing attention, aiding product recognition, simplifying product evaluation, enhancing recall, and differentiating an offer from competing offers. Perhaps most important of all was the emotional response, which significantly mediated the link between the neuromarketing stimuli and the purchase decision. The result of the partial mediation model shows that the neuromarketing stimuli have a direct impact on consumer behavior as well as an indirect impact through their emotional response. Emotional response is, therefore, a psychological connection between marketing design and purchasing behavior.

This study adds to the neuromarketing literature by incorporating sensory marketing stimuli, emotional reactions and purchasing decisions into the S-O-R model. It also brings empirical evidence from Pakistan and highlights the need to study stimuli in the field of neuromarketing, outside of highly controlled neurological laboratories. As seen from the managerial point of view, the results indicated that effective campaigns in marketing should have sensory coherence and emotional relevance, functional value, and cultural adaptation. Organizations should start

creating stimuli that will catch the interest of consumers, create positive emotions without overloading, misleading, or manipulating consumers. If used with transparency and in a responsible manner, the neuromarketing-informed strategies can help brands better engage their consumers, enhance their customer experience, make their brand stand out from the competitors, and make better marketing decisions.

7. Theoretical Implications

This study continues to build on the Stimulus-Organism-Response model, bridging the gap between the stimuli and consumers' emotional response to them and their purchase decisions. The stimulus is visually, aurally, sensually, and emotionally engaging; the organism is the emotional response, and the behavioral outcome is the purchase decision. The results thus confirm the idea that environmental stimuli impact behavior in part through internal psychological processes (Mehrabian & Russell, 1974; Donovan & Rossiter, 1982). Additionally, this study points to emotional response as a salient mediating mechanism. Neuromarketing stimuli that induce pleasure, excitement, curiosity, and emotion are more effective, consistent with previous studies related to the influence of emotions in advertising and consumption (Holbrook & Batra, 1987; Achar et al., 2016). The partial mediation of the complementary role of the neuromarketing stimuli also indicates that the neuromarketing stimuli can directly impact purchasing decisions and indirectly via emotion.



Further, the study advances the study of perception-based neuromarketing research by showing that consumers' responses to neuromarketing-informed cues can be analyzed using survey research techniques. While they cannot be used in place of neurological measures, self-reported perceptions can be used to study larger samples and real-market experiences (Plassmann et al., 2012; Rawnaque et al., 2020). Last but not least, the study takes a step to explore the applicability of neuromarketing research to an under-researched emerging-market context and demonstrates the applicability of the S-O-R framework in different cultural and socioeconomic settings (Ali et al., 2022; Farooq & Ahmad, 2023). It also contributes to mediation besides business research by bringing into the picture the consideration of emotional response as the psychological process between marketing stimuli and consumer behavior (Anser et al., 2024, 2025; Naeem et al., 2024).

8. Practical Implications

The results indicate that marketing professionals need to focus on achieving specific emotional goals, such as excitement, trust, comfort, curiosity, and urgency. Visuals, sounds, and sensory experiences should be unified to evoke the desired emotional reaction and not in isolation.

Visual Communication should be clear, contrasting, hierarchical, and imagery, but avoid clutter and overstimulation. Likewise, music, voice, tempo, and sound effects should correspond to the brand identity, product category, and target

audience. Just looking at the impressions, clicks, and the awareness created is not enough to measure the effectiveness of a campaign. Finally, firms need to analyze if marketing stimuli evoke the desired emotions using surveys, A/B tests, eye tracking studies, facial analysis, or other behavioral methods.

Retailers need to develop a uniform multisensory environment, match the lighting, music, scent, product appearance, digital content, and customer interaction. There needs to be a consistent brand message on both the physical and digital platforms (Krishna, 2012). Emotional response, however, is only a partial determinant of purchase, so companies need to be persuasive by appealing to both the functional value (product features, clear pricing, ease of use, credibility, and availability) and the emotional response. Marketing campaigns should also be tailored to Pakistani consumers' cultural, linguistic, religious, and regional requirements, and pre-tested before being implemented.

9. Future directions

Longitudinal and experimental designs will be necessary for future studies to provide more definitive conclusions about causality. Researchers should provide a combination of the survey responses and actual purchase data, clickstream behavior, product-choice experiments, eye tracking, EEG, facial coding, and galvanic skin response. Future studies could investigate the individual effects of visual, auditory, olfactory, tactile, pricing, scarcity, and storytelling stimuli. The moderating variables like consumer



involvement, impulsivity, advertising skepticism, personality, age, gender, culture, income, and digital literacy can also be studied. A comparative study of the marketplaces in different cities, provinces, and rural/urban areas of Pakistan across product categories would give a better idea of the timing of when these neuromarketing stimuli would be effective.

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