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NEUROMARKETING: EXPLORING COGNITIVE RESPONSE ON CONSUMER BUYING DECISIONS TO ADVERTISEMENT OF RETAIL STORES IN OMAN

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Abstract:
Purpose: This study examines how neuromarketing strategies, advertisement content, and cultural factors influence customers' cognitive and emotional responses, subsequently affecting buying intention in Oman's retail sector. The purpose is to bridge the gap in understanding subconscious consumer behavior within an emerging market

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in Oman where traditional and modern retail cultures coexist. Quantitative data were collected from 170 Omani retail customers across various sectors using a structured questionnaire. Descriptive analysis, reliability testing, Pearson correlations, and multiple regression models were applied. Constructs included neuromarketing techniques (emotional appeal, sensory stimuli, attention triggers), advertisement content (emotional vs. rational), cultural factors, cognitive and emotional responses, and buying intention. **Findings:** Results revealed high internal consistency (Cronbach's α = 0.756–0.913). Regression analysis showed that neuromarketing techniques (β = 0.314, $p < 0.001$), advertisement content (β = 0.425, $p < 0.001$), and cultural factors (β = 0.254, $p < 0.001$) significantly predicted buying intention, mediated by cognitive and emotional responses. Emotional advertisement content displayed the strongest positive effect on emotional engagement and purchase intent. **Originality/Value:** This study provides one of the first empirical examinations of neuromarketing in Oman, incorporating neuroscience-based perceptions with cultural dimensions to enrich understanding of consumer behavior in Oman market. It encompasses the Stimulus–Organism–Response (S–O–R) model to a Middle Eastern retail context. **Practical Implications:** Marketers and policymakers can influence neuromarketing tools (EEG, eye-tracking) and culturally aligned emotional appeals to design more effective advertisements that improve recall, trust, and buying intention among Omani consumers.

Keywords: neuromarketing, advertisement, cognitive response, consumer behaviour

1. Introduction

In an age dominated by digital exposure and powerful market rivalry, understanding the unseen drivers behind consumer decision-making has developed more critically than ever. Conventional marketing research based on surveys, interviews, and focus groups mostly captures self-reported preferences, which frequently reflect post-hoc rationalizations rather than genuine motivations. Neuromarketing, on the other hand, offers a transformative method by directly tapping into customers' cognitive and emotional reactions to stimuli, offering insights into subconscious responses that old-style methods miss (Reimann *et al.*, 2010; Plassmann *et al.*, 2015).

Neuromarketing combined methods from neuroscience and psychology to measure and evaluate physiological indicators such as neural activity, galvanic skin response, eye-tracking, and heart rate prompted by advertising stimuli (Nakamura & El-Moujahid, 2025). Neuroimaging tools like electroencephalography (EEG) and functional magnetic resonance imaging (fMRI) disclose movement in brain regions connected to emotion, reward processing, and memory. These approaches make it possible to detect how customers respond in real time to marketing stimuli and differentiate between unconscious emotional drives and conscious reasoning.

Key brain regions play distinguishable roles in determining buying behavior. The amygdala processes emotional relevance and brand resonance; the prefrontal cortex

assesses utility and value; the nucleus accumbens, connected with pleasure and reward, ignites when anticipating gratification; and the hippocampus plays an essential role in memory encoding and brand recall (Kahan, Liu & Miao, 2013). Neuromarketing research has proven that emotionally rich advertising engages the amygdala and memory centers more effectively than neutral advertising, often leading to higher recall and stronger buying intent.

The Omani retail sector, like many others in the Middle East, has observed a rapid growth, with an increasing emphasis on contemporary retail formats and classy marketing techniques (Al-Ansari, 2020). As competition strengthens, retailers in Oman are gradually adopting innovative marketing strategies to entice customers. However, there is partial research on the cognitive and emotional responses of customers to retail advertisements. Understanding how patrons perceive and respond to advertisements can provide valuable insights into the cultural and psychological factors that influence their purchasing decisions. This is especially important in a country where traditional values coexist with contemporary consumerism, potentially influencing how advertisements are received.

The main objective of this research is to discover how neuromarketing techniques can be used to evaluate the cognitive responses of consumers to retail advertisements in Oman. By exploring the relationship between cognitive responses and purchasing decisions, the study seeks to offer an understanding of the factors that influence consumer behavior in the Omani retail context. In doing so, the research provides practical implications for retailers and marketers seeking to enhance their advertising strategies and boost customer engagement.

1.2 Problem Statement

Current studies in neuromarketing mostly focus on Western markets, leaving a gap in understanding how cultural and emotional contexts shape consumer cognition in Omani society. This gap matters because advertising strategies that ignore local cultural dynamics risk emotional dissonance, dropping engagement and purchase intention. This study addresses the gap by empirically investigating how neuromarketing methods, advertisement content, and cultural factors influence cognitive and emotional responses that determine buying intentions in Oman's retail.

1.3 Research Objectives

1) To evaluate the effect of neuromarketing techniques (emotional appeal, attention triggers, and sensory stimuli) on consumers' cognitive responses to retail advertisements in Oman.
2) To compare the impact of emotional versus rational advertisement content on consumers' emotional engagement.
3) To assess the role of cultural factors in shaping the cognitive and emotional responses of consumers to retail advertisements.

4) To analyze the influence of cognitive elements such as attention and memory recall on consumer buying intentions in the context of retail advertising.

2. Literature Review

Neuromarketing, the intersection of neuroscience and marketing, has become a prominent area of research that discovers how customer behavior is influenced by cognitive and emotional responses to advertisements. This literature review tries to explore the current research concerning consumer cognitive responses to retail advertisements, particularly in the context of Oman, where traditional values intertwine with contemporary consumer behaviors.

2.1 Underpinning Theory

This study is grounded in the Stimulus–Organism–Response (S–O–R) model proposed by Mehrabian and Russell (1974). The S–O–R framework describes how external stimuli (S) induce internal psychological and emotional states within individuals (O), which then drive behavioral responses (R). In marketing research, the model is broadly used to understand how environmental cues such as advertisements, branding, or store design influence consumer emotions, cognition, and behavioral outcomes (Donovan & Rossiter, 1982; Lee *et al.*, 2011).

In this study, neuromarketing techniques, advertisement content, and cultural factors represent the *stimuli*; cognitive and emotional responses form the *organismic states*; and consumer buying intention constitutes the *response*. The model delivers a strong theoretical foundation to examine the interaction between subconscious consumer processing and observable behavioral outcomes in the Omani retail context.

2.2 Cognitive Responses to Advertisements

Cognitive responses to advertisements, including attention, memory, and comprehension, are critical in determining consumer behavior. Attention, the ability to concentrate on an advertisement within several distractions, plays a vital role in whether an advertisement will influence consumer decisions (Nieuwenhuis *et al.*, 2006). Studies have revealed that advertisements which attract attention over visual stimuli, colors, or messages are more likely to be processed and remembered, leading to higher consumer engagement (Lang *et al.*, 2000).

Memory is an additional important aspect of cognitive response. When customers can recall advertisements or specific details from an advertisement, they are more likely to develop favorable behavior towards the brand and increase their intent to buy (Schaefer & Rotte, 2007). In the framework of Oman, where the retail environment is quickly evolving, understanding how advertisements are encoded into memory is vital for marketers looking for long-term brand recognition.

2.3 Emotional Reactions and Purchase Intentions

The emotional response to advertisements, frequently a key driver of consumer decision-making, is generally recognized as a powerful influencer of purchasing decisions. Emotional responses such as joy, trust, and excitement can significantly influence the probability of a purchase (Schaefer & Rotte, 2007). For instance, advertisements that induce positive emotional reactions are more likely to be linked with higher purchase intentions and brand loyalty (Plassmann *et al.*, 2015).

In the Middle Eastern setting, emotional responses to advertisements may be more influenced by cultural nuances. Oman, with its mixture of traditional Arab culture and modern influences, might present unique emotional triggers for customers. Research proposes that consumers in such regions respond more strongly to advertisements that resonate with cultural values, such as family, respect, and tradition, while modern elements like accessibility and technology may also influence emotional reactions (Al-Ansari, 2020). Thus, understanding the emotional influence of advertisements within the Omani context is important for making effective retail marketing strategies.

2.4 Cultural Factors in Cognitive and Emotional Responses

Cultural influences are important in shaping how advertisements are perceived and processed. According to Hofstede's cultural dimensions theory, countries with high power distance and collectivism, such as Oman, incline to have more family-oriented and tradition-based values (Hofstede, 2001). This indicates that Omani consumers may respond more positively to advertisements that highlight community, family bonds, or social cohesion.

Likewise, the Omani retail environment is deeply influenced by the balance between traditional culture and a growing exposure to global trends. As Al-Ansari (2020) points out, Omani consumers are gradually exposed to Western marketing methods, which may change how they emotionally engage with advertisements. Neuromarketing can deliver insights into these cultural intersections, allowing marketers to develop a campaign that merges traditional values with modern advertising strategies.

2.5 Influence of Cognitive Elements on Consumer Buying Intentions

Investigation on the influence of cognitive elements, predominantly attention and memory recall, has progressively focused on their role in shaping consumer buying goals within retail advertising contexts. Studies show that attention is a key precursor to effective memory encoding, directly affecting how advertisements are handled and recalled by consumers (Petty & Cacioppo, 1986). Memory recall, in turn, boosts the likelihood of obtaining by helping brand recognition and influencing customers' attitudes towards products (MacInnis & Jaworski, 1989). Moreover, the relationship between these cognitive processes highlights the importance of advertising strategies that attract attention and help profound processing, as evidenced by findings that suggest consumers are more likely to engage with and remember advertisements that utilize vivid imagery and emotional appeals (Keller, 1993). Generally, understanding these

cognitive dynamics is important for retailers, aiming to enhance their advertising effectiveness and drive consumer behavior.

2.6 The Role of Neuromarketing Tools in Understanding Consumer Behavior

Neuromarketing tools, such as eye-tracking, facial coding, and EEG (electroencephalography), are valuable for understanding the subconscious responses of customers to advertisements. These procedures provide more exact data than traditional surveys or focus groups, capturing real-time physiological and emotional reactions (Lee *et al.*, 2011). Eye-tracking, for example, can recognize which parts of an advertisement capture the most attention, providing insights into effective design strategies (Poels & Dewitte, 2006).

EEG and facial coding techniques can propose further understanding of emotional responses, revealing whether an advertisement creates positive or negative feelings (Plassmann *et al.*, 2015). In Oman, where the retail market is growing rapidly, neuromarketing can help reveal subconscious patterns in consumer decision-making, offering more precise and actionable insights compared to conventional methods.

The existing literature on neuromarketing underscores the critical role of cognitive and emotional responses in shaping consumer buying decisions. While research on consumer behavior in Oman is still evolving, studies indicate that cultural and emotional factors are vital for understanding the effectiveness of advertisements in the region. Neuromarketing techniques, which offer a greater insight into consumer behavior than traditional methods, are mostly useful for gauging customer responses to retail advertisements. As the Omani retail market continues to grow, leveraging these techniques will become increasingly crucial for marketers seeking to optimize their strategies.

2.7 The Conceptual Framework

SOR Model The conceptual framework in this study is based on the SOR model by Mehrabian and Russell (1974)**.** The **Stimulus–Organism–Response (SOR) model** explains how external factors influence human behaviour. In this model, the **stimulus** refers to environmental or situational cues. The **organism** represents the individual's internal processes, including perceptions, emotions, attitudes, and motivation. These internal reactions then lead to a **response**, which is the observable behaviour or outcome, such as engagement, satisfaction, performance, or turnover intentions.

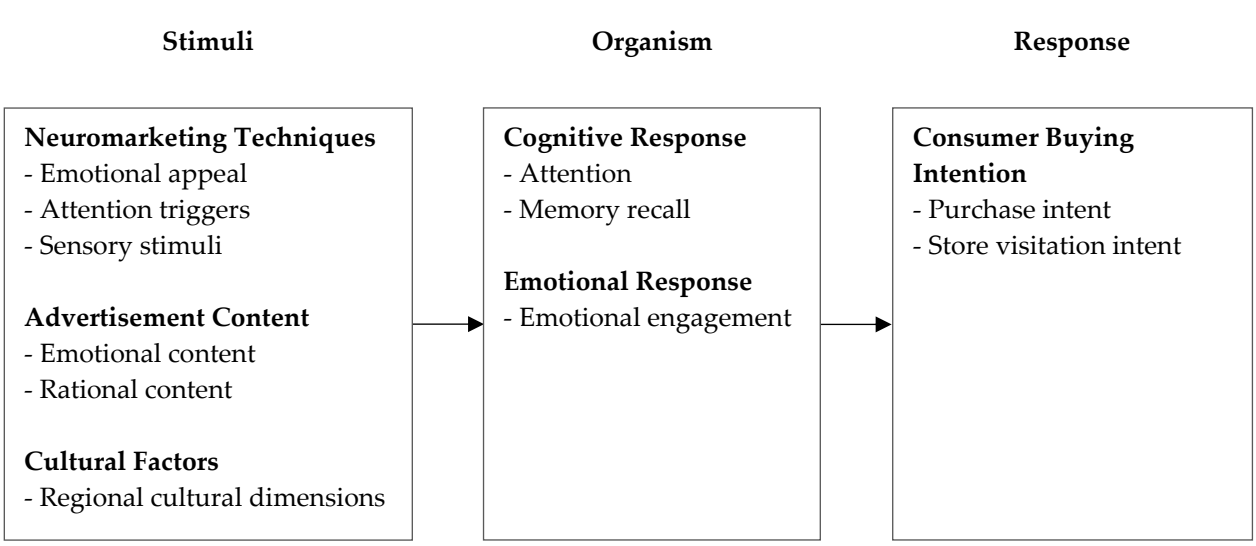

Figure 1: Research Model

3. Material and Methods

3.1 Research Design

This study employs a mixed-methods research design to explore the impact of neuromarketing techniques on consumer buying decisions in Oman, focusing on cognitive and emotional responses to retail advertisements. The qualitative component involved semi-structured interviews with diverse customers to gather rich contextual insights, while the descriptive component was utilized a structured survey to quantitatively assess the relationships between the variables.

3.2 Sampling

The respondents for this study were consumers in Oman, ages 18 to 45, who were regularly involved in retail shopping. The sample was selected using random sampling to ensure that the results are representative of the larger consumer base. A sample size of 170 participants was chosen as this will provide adequate statistical influence to perceive meaningful relationships between neuromarketing variables and cognitive responses (Cohen, 1992).

3.3 Data Collection Method

The data was collected and tabulated using survey questionnaires in selected 20 retail stores in Oman with the categories of Coffee shop, Restaurant, Furniture Shop, Electronic Shop and Perfume Shop, Respondent completed surveys, which included questions about their cognitive responses and buying intention to advertisements (emotional response, attention, and recall). These responses were measured on a Likert scale.

3.4 Variables

3.4.1 Independent Variables

- **Neuromarketing Techniques**: This comprises emotional appeal, attention-capturing elements, and sensory stimuli used in retail advertisements (Lindstrom, 2010).
- **Advertisement Content**: Different types of advertisement content tested, such as emotional, rational, and mixed content.
- **Cultural Factors**: National or regional cultural dimensions such as collectivism, individualism, and power distance.

3.4.2 Dependent Variables

- **Cognitive Response**: This is measured in terms of attention, emotional engagement, and memory recall.
- **Emotional Response**: Emotional engagement
- **Consumer Buying Intention**: The likelihood of purchasing the product or visiting the retail store post-advertisement exposure.

3.5 Data Analysis

The data collected was analyzed using SPSS (Statistical Package for the Social Sciences). Initially, descriptive statistics were employed to summarize the demographic characteristics of the participants, providing insights into their profiles and general cognitive responses to advertisements. This includes measures such as mean, median, mode, and standard deviation to capture the central tendencies and variations within the data. Subsequently, regression analysis was conducted to measure the impact of neuromarketing techniques on consumer buying decisions and cognitive responses. Both variables were also tested for validity, and the reliability of the questions was examined using the Cronbach Alpha.

3.6 Ethical Considerations

Ethical concerns are critical in any research involving human participants, particularly when using neuromarketing tools that track physiological responses. To address these concerns:

- **Informed Consent**: Participants were informed about the study's purpose, procedures, and potential risks. Every participant signed consent forms before participating.
- **Confidentiality**: Personal data is anonymized.
- **Right to Withdraw**: Participants have the right to withdraw from the study at any point if they don't feel comfortable with the questions.

3.7 Limitations

Limitations of this study:

- **Cultural Bias**: The study focuses on different nationality consumers in Oman Such as Indian, Omani, Philippines, Pakistan, Egyptian and others, and results may not be valid for other regions with different cultural backgrounds.
- **Self-Reported Data**: Survey responses may be subject to social desirability bias, where participants report what they think is expected rather than their actual cognitive responses.

4. Results and Discussion

Table 1 shows the number of respondents; there were 170 individuals categorized by age, gender, education, and shopping frequency. In terms of age distribution, the majority group is individuals aged 31-37, comprising 38.2% (65 participants), followed by those aged 24-30 at 28.8% (49 participants). The 18-23 age group accounts for 22.3% (38 participants), while the 38-45 age group is the smallest, with 10.5% (18 participants).

With regards to gender, females represent a majority at 57% (97 participants), while males make up 43% (73 participants). While the education levels, most respondents hold a bachelor's degree, accounting for 38.2% (65 participants). Those with a diploma follow closely at 35.2% (60 participants), and 22.3% (38 participants) have secondary education or below. Fewer individuals possess a master's degree (1.7%, 3 participants) or a PhD (2.3%, 4 participants).

Lastly, shopping frequency shows that 67% (114 participants) shop frequently, while 33% (56 participants) shop occasionally. This data illustrates diverse demographic characteristics and shopping behaviors among the surveyed group.

Table 2 presents the mean scores and standard deviations for four key components associated to customer response to neuromarketing strategies. All components have comparatively high mean values, indicating a positive perception among respondents concerning the influence of these factors.

Table 1: Respondents

Indicator	Category	Frequency	Percentage (%)
Age	18-23	38	22.3
	24-30	49	28.8
	31-37	65	38.2
	38-45	18	10.5
	Total	**170**	**100.0**
Gender	Male	73	43.0
	Female	97	57.0
	Total	**170**	**100.0**
Education	Secondary/Below	38	22.3
	Diploma	60	35.2
	Bachelor	65	38.2
	Master	3	1.7
	PhD	4	2.3
	Total	**170**	**100.0**

Shopping Frequency	Occasional	56	33.0
	Frequent	114	67.0
	Total	**170**	**100.0**

Cultural Factors (Mean = 4.5, SD = 0.588): This component received the highest mean score, suggesting that cultural factors are perceived as the most significant in affecting customer behavior. Advertisement Content Type (Mean = 4.1, SD = 0.62) and Cognitive Response and Buying Intention (Mean = 4.1, SD = 0.46): Both components indicate strong mean values, reflecting that the content of advertisements and the consumers' cognitive and emotional responses significantly affect buying intentions. Particularly, the lower SD for Cognitive Response (0.46) suggests higher consistency in responses compared to Advertisement Content. Neuromarketing Techniques of Retail Stores (Mean = 4.0, SD = 0.632): This component also scores high, demonstrating a general agreement that neuromarketing techniques used in retail environments are active. However, it has the highest standard deviation, inferring slightly more mixed opinions among respondents.

Table 2: Mean and Standard Deviation

Component	Mean	Std. Deviation
Neuromarketing Techniques of Retail Stores	4	0.632
Advertisement Content Type	4.1	0.62
Cultural Factors	4.5	0.588
Cognitive Response and Buying Intention	4.1	0.46

In Table 3, the reliability of neuromarketing techniques in retail stores has been assessed using Cronbach's Alpha, stressing the effectiveness of these constructs in understanding consumer behavior. Emotional Appeal, with a Cronbach's Alpha of 0.768, and Sensory Stimuli at 0.756, equally fall within the acceptable range, signifying they are reasonably reliable indicators of consumer responses (Nunnally & Bernstein, 1994). Attention Triggers, evaluated at 0.827, validated good reliability, which aligns with current literature highlighting the significance of attracting consumer attention in retail environments (Pine & Gilmore, 1999). In contrast, Cultural Factors display an exceptional reliability score of 0.913, underlining their critical role in shaping marketing strategies (Hofstede, 2001). The cognitive responses related to buying intention disclosed good reliability across constructs, particularly Memory Recall and Buying Intention, both scoring 0.887 (Kotler & Keller, 2016). These findings are important in ensuring that the quality of data is built on robust measurement tools.

Table 3: Reliability Test

Variable	Items	Cronbach Alpha	Reliability
Section A: Neuromarketing Techniques of Retail Stores			
Sub-construct 1: Emotional Appeal	3	0.768	Acceptable
Sub-construct 2: Attention Triggers	3	0.827	Good
Sub-construct 3: Sensory Stimuli	3	0.756	Acceptable
Sectio B: Advertisement Content Type	5	0.767	Acceptable
Section C: Cultural Factors	5	0.913	Excellent
Section D: Cognitive Response and Buying Intention			
Sub-construct 1: Attention	3	0.812	Good
Sub-construct 2: Memory Recall	3	0.887	Good
Sub-construct 3: Emotional Engagement	3	0.746	Acceptable
Sub-construct 4: Buying Intention	3	0.887	Good

Table 4 displays the Pearson correlation analysis of independent variables and their relationship to buying intention reveals meaningful insights into consumer behavior influenced by neuromarketing techniques. Remarkably, H1. neuromarketing Techniques Display a robust positive correlation with Cognitive Response ($r = 0.62$) and a moderate positive correlation with both Emotional Response ($r = 0.55$) and Buying Intention ($r = 0.47$). All correlations are statistically significant ($p < 0.05$), showing that exposure to neuromarketing strategies has a significant influence on how customers process, feel, and act on advertisements. Neuromarketing significantly impacts cognitive and emotional processing, which contributes to increased buying intention. H2. Advertisement Content Correlation with Emotional Response is very strong ($r = 0.71$) and highly significant ($p = 0.000$), confirming that emotional ad content leads to stronger emotional commitment than rational content. There is also a moderate, significant correlation with Cognitive Response ($r = 0.33$, $p = 0.045$) and Buying Intention ($r = 0.40$, $p = 0.012$). Thus, Emotional advertisements are more effective in motivating emotional engagement, which completely influences cognitive attention and customer behavior. H3. Cultural Factors show moderate, significant positive correlations with both Cognitive Response ($r = 0.48$, $p = 0.008$) and Emotional Response ($r = 0.50$, $p = 0.005$). Nevertheless, the correlation with Buying Intention ($r = 0.30$) is weak and not statistically significant ($p = 0.061$). Cultural factors significantly form how buyers practice and emotionally react to advertisements, but do not strongly predict buying intention in this study. H4. Buying Intention and its Predictors, both Neuromarketing Techniques and Advertisement Content demonstrates statistically significant positive correlations with Buying Intention, proposing that these aspects play an important role in encouraging customers to make purchase decisions. Cultural Factors, though affecting emotion and cognition, have a less direct influence on actual buying behavior. Attention and memory proxied by neuromarketing and ad content are positively associated with purchase intention. Cultural influence is less predictive in this case.

Table 4: Pearson Correlation for Independent Variables and Dependent Variable

Variables	Cognitive Response	Emotional Response	Buying Intention
Neuromarketing Techniques	r = 0.62, p = 0.001 **(Significant)**	r = 0.55, p = 0.003 **(Significant)**	r = 0.47, p = 0.010 **(Significant)**
Advertisement Content	r = 0.33, p = 0.045 **(Significant)**	r = 0.71, p = 0.000 **(Highly Significant)**	r = 0.40, p = 0.012 **(Significant)**
Cultural Factors	r = 0.48, p = 0.008 **(Significant)**	r = 0.50, p = 0.005 **(Significant)**	r = 0.30, p = 0.061 (Not **Significant)**

Table 5 shows that the multiple regression analysis discloses the predictive power of neuromarketing techniques, advertising content, and cultural factors on cognitive response, emotional response, and buying intention. The outcomes show that Neuromarketing Techniques of Retail Stores significantly predict Cognitive Response ($\beta = 0.314$, $p < 0.000$), Emotional Response ($\beta = 0.321$, $p < 0.000$), and Buying Intention ($\beta = 0.314$, $p < 0.000$). Likewise, Advertisement Content is a strong predictor of Cognitive Response ($\beta = 0.456$, $p < 0.000$), Emotional Response ($\beta = 0.455$, $p < 0.000$), and Buying Intention ($\beta = 0.425$, $p < 0.000$). Cultural Factors also significantly impact Cognitive Response ($\beta = 0.273$, $p < 0.000$), Emotional Response ($\beta = 0.289$, $p < 0.000$), and Buying Intention ($\beta = 0.254$, $p < 0.000$). These findings suggest that a holistic approach, integrating neuromarketing strategies, relevant advertising content, and cultural considerations, is important for increasing consumer cognitive and emotional engagement, finally driving buying intention. The beta coefficients signify the strength and direction of each predictor variable, emphasizing the importance of each factor in shaping consumer behavior.

Table 5: Results of Multiple Regression

Variable		Dependent: Cognitive Response		Dependent: Emotional Response		Dependent: Buying Intention	
Independent	***B***	**Beta**	**Sig**	**Beta**	**Sig**	**Beta**	**Sig**
Neuromarketing Techniques of Retail Stores	0.287	0.314	0.000	0.321	0.000	0.314	0.000
Advertisement Content	0.437	0.456	0.000	0.455	0.000	0.425	0.000
Cultural Factors	0.286	0.273	0.000	0.289	0.000	0.254	0.000

5. Recommendations

- **Highlight Emotional Content:** Sellers must design advertisements that induce strong emotional responses, as these boost memory retention and purchase intent.
- **Leverage Neuromarketing Tools:** Integrating tools like eye-tracking and EEG in campaign testing can help recognise which elements of an ad resonate most with customers.
- **Cultural Sensitivity:** Sellers must align ad content with local cultural values to increase importance and recognition among Omani consumers.

- **Customer Segmentation:** Apply neuromarketing insights to diverse customer segments to tailor messaging more effectively based on emotional and cognitive profiles.
- **Further Research:** Future studies could expand into specific retail sectors such as fashion, and electronics or compare urban vs. rural customer responses in Oman for more targeted strategies.

6. Conclusion

The research concludes that neuromarketing provides valuable insights into the cognitive and emotional processes underlying consumer buying behavior in Oman. Retail advertisements that stimulate emotional regions of the brain, such as the amygdala and hippocampus, are more likely to boost memory recall and influence purchase decisions. The study also highlights the role of cultural context in influencing customer responses, confirming that effective advertisements must balance modern appeal with traditional values. Generally, neuromarketing helps to bridge the gap between consumer perception and actual behavior. This research methodology provides a structured approach to discovering the relationship between neuromarketing, cognitive responses, and consumer buying decisions in Oman. By employing both quantitative and qualitative methods, the study aims to contribute valuable insights to the field of marketing and consumer behavior.

Conflict of Interest Statement
The authors declare no conflicts of interest.

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