BRAINWAVE ANALYSIS AND CONSUMER PREFERENCES: A NEUROMARKETING STUDY ON ADVERTISING CAMPAIGNS

Nilesh Anute, Sri Balaji University, Pune

ABSTRACT

This study investigates the correlation between brainwave activity and consumer preferences during exposure to advertising campaigns. Through the use of neuromarketing techniques, namely with electroencephalogram (EEG) data, we investigate the emotional and cognitive responses elicited by various kinds of commercials. The purpose of the study is to evaluate how well different advertising components, such as images, music, and messaging capture consumers' attention and influence their purchasing decisions. The analysis included a sample of 150 respondents, and the preferences and decision-making processes were interpreted using both survey responses and EEG data. Significant correlations between certain brainwave patterns (alpha, beta, and gamma waves) and consumer engagement, emotional connection, and purchase intent were found via quantitative analysis. According to the findings, businesses may create more focused and successful ads by using neuromarketing techniques like brainwave analysis to get a deeper understanding of consumer psychology.

Keywords: Brainwave Analysis, Neuromarketing, Electroencephalography (EEG), Emotional Engagement, Consumer Preferences, Advertising Campaigns, Cognitive Responses, Purchasing Behavior.

INTRODUCTION

Neuromarketing, an interdisciplinary field combining neuroscience and marketing, has gained significant attention in recent years for its potential to revolutionize consumer insights and advertising strategies. Marketers can also now get a deeper knowledge of customers' unconscious emotions and selection-making procedures through using brainwave evaluation thru techniques like electroencephalography (EEG). Researchers may uncover cognitive and emotional responses that are often undetectable by conventional survey techniques by detecting the electrical activity in the brain (Harris, Ciorciari, & Gountas, 2018).

According to studies, consumer interaction with advertisements may be gleaned via brainwave analysis. For example, higher beta wave activity is connected to focused attention and cognitive processing, while higher alpha wave activity has been linked to relaxation and pleasant emotional responses (Byrne et al., 2022). These results imply that certain advertising components, such as images, sounds, and text, may elicit quantifiable brain responses that are correlated with consumer behavior. Therefore, a more sophisticated knowledge of how advertisements affect feelings, attention, and eventually purchase choices is provided by neuromarketing techniques.

The advertising business is seeing an increase in the effectiveness of neuromarketing, as shown by recent study. According to a research by Khushaba et al. (2013), based on consumers' brain responses to advertising stimuli, EEG-based brainwave analysis might be used to forecast their preferences for certain items. In a similar vein, Ohme et al. (2010) investigated how emotional involvement as decided by means of brainwave styles may also decorate the effectiveness of commercials.

Citation Information: Anute, N. (2025). Brainwave analysis and consumer preferences: a neuromarketing study on advertising campaigns. *Academy of Marketing Studies Journal, 29*(3), 1-12.

These findings spotlight the ability of neuromarketing to beautify advertising and marketing campaigns via customizing them to consumers' subconscious responses.

Furthermore, firms may now include brainwave analysis into their marketing plans because to the growing availability of neuromarketing technologies. This change is especially significant as it is difficult for conventional marketing strategies to comprehend the complexity of contemporary consumer behavior, which is impacted by a wide range of emotional, social, and cognitive elements (Stasi et al., 2018). By removing the influence of self-reporting biases and using real-time brain activity, neuromarketing offers a more straightforward approach to comprehending these intricate elements.

Neuromarketing poses ethical questions about privacy and the manipulation of consumer behavior despite its potential. The ethical use of firms' increased understanding of their audience's subconscious processes is a topic of increasing discussion (Fisher, Chin, & Klitzman, 2010). However, there is no denying the advantages of neuromarketing, especially with regard to its capacity to improve advertising tactics via the use of scientific, neurological data.

The purpose of this research is to look into the connection between consumer preferences and brainwave activity when they are exposed to advertising campaigns. We want to understand how various kinds of advertisements generate emotional and cognitive responses that influence consumer behavior by studying EEG data in conjunction with consumer feedback. The results of this study will add to the expanding body of knowledge on neuromarketing and provide marketers looking to enhance the effectiveness of their ads with useful information.

REVIEW OF LITERATURE

The field of neuromarketing—the fusion of neuroscience and marketing—is becoming more and more acknowledged as a potent instrument for comprehending consumer behavior. EEG techniques, in particular, have allowed for the use of brainwave analysis to shed light on the emotional and cognitive processes that underlie consumer choices. Plassmann et al. (2015) demonstrated the effectiveness of EEG in evaluating subconscious responses to marketing stimuli, which is one of the basic research in the subject of neuromarketing. The authors stressed that while subconscious emotional responses are important in consumer decision-making, they are often overlooked in standard marketing research. EEG provides a more objective measure of attention and engagement, enabling marketers to evaluate the ways in which various advertisements impact consumer preferences. EEG monitors electrical activity in the brain.

By investigating the connection between brainwave rhythms and emotional engagement during TV advertisements, Sánchez et al. (2021) elaborated on this. Their research showed a strong correlation between attention and memory recall and certain brainwaves, including theta and alpha waves. The results corroborated the hypothesis that advertisements with a compelling emotional appeal or storyline were more likely to produce greater levels of brainwave engagement, as seen by the participants' brainwave activity. Bosshard et al. (2016) demonstrated that advertisements that evoked pleasant emotions increased alpha wave activity, suggesting a calm but alert mental state that was favorable to consumer receptivity.

Venkatraman et al. (2015); Vecchiato et al. (2011) made a significant addition to the area when they suggested that neuromarketing may have predictive ability to anticipate the outcome of advertising efforts. Through a comparison of EEG readings and conventional self-reported data, they discovered that brainwave analysis yielded more precise predictions of consumer behavior. The limits of self-reporting techniques, which are often biased, were

Citation Information: Anute, N. (2025). Brainwave analysis and consumer preferences: a neuromarketing study on advertising campaigns. *Academy of Marketing Studies Journal, 29*(3), 1-12.

brought to light in this research, which also demonstrated how neuromarketing may be able to uncover subconscious preferences that are hidden from view by traditional survey methods.

Numerous investigations have also looked at the connection between brainwave activity and certain advertising components, such music, graphics, and storytelling. EEG frontal asymmetry's function in assessing emotional responses to advertisements was the subject of Ohme, Reykowska, Wiener, and Choromanska (2010). Their study demonstrated that emotionally charged material increased the chance of good consumer responses by activating the left frontal brain, which is linked to pleasant emotional states. This is consistent with research by Stasi et al. (2018), who looked at the effects of visual stimuli in advertisements and found that visually attractive ads were more successful at evoking positive emotional responses and producing greater levels of alpha wave activity.

Online and digital advertisements have been the subject of research on the use of brainwave analysis to comprehend consumer preferences. EEG was used by Harris, Ciorciari, and Gountas (2018) to examine the effectiveness of digital media advertisements. They discovered that emotionally charged material was more successful at attracting viewers' attention and eliciting favorable responses. Their results add credence to the increasing body of evidence that emotional engagement should be taken into consideration when designing digital advertisements since it has a direct impact on consumer behavior.

The effectiveness of neuromarketing is being supported by an increasing amount of research, although questions have been raised about the moral implications of its use. Fisher, Chin, and Klitzman (2010) spoke about the potential dangers of changing consumer subconscious preferences and made the case that, if not properly controlled, neuromarketing might result in deceptive advertising methods. These worries emphasize the need of striking a compromise between protecting consumer autonomy and making use of neuromarketing insights for efficient advertising.

RESEARCH METHODOLOGY

For this study, a cross-sectional survey research design was deemed appropriate. A sample size of 150 respondents, representing a range of demographic backgrounds such as students, working professionals, and retirees from various parts of India, was selected to provide an appropriate representation of consumer preferences and neurological responses to advertising campaigns. This method was created to record a wide range of consumer behavior concerning neuromarketing.

By use of stratified random sampling, the population was segmented into groups according to factors such as gender and age. To guarantee a representative sample of different consumer categories, respondents were chosen at random from each stratum. This technique made it easier to comprehend how various demographic characteristics affect consumers' preferences and brainwave patterns when they are exposed to advertising campaigns. The study attempted to account for the potential diversity in consumer responses to advertisements across distinct groups by enrolling participants from a range of age groups and occupations.

Online surveys and portable EEG equipment were used to record brainwaves for the main data gathering strategy. In order to collect quantifiable data on respondents' preferences and views of different advertising components, such as images, message, and emotional appeal, the online questionnaire included twenty closed-ended questions. Following the respondents' exposure to a series of advertisements, the questionnaire was given out, and brainwave activity was concurrently monitored.

Citation Information: Anute, N. (2025). Brainwave analysis and consumer preferences: a neuromarketing study on advertising campaigns. *Academy of Marketing Studies Journal, 29*(3), 1-12.

This study's primary objectivel was to examine the connection between consumer preferences and brainwave activity during the exposure of advertisements. The purpose of the study was to ascertain if certain brainwave patterns—such as alpha or beta waves—were associated with increased emotional reaction, engagement, and preference for particular advertisements over time. Examining whether demographic variables like age and gender affected these behavioral and neurological responses was a secondary objective of the study Tables 1-20.

The hypotheses for the study are as follows:

Hypothesis 1:

H_0: *"There is no significant association between brainwave activity and consumer preferences for advertising campaigns"*

H_1: *"There is a significant association between brainwave activity and consumer preferences for advertising campaigns."*

Hypothesis 2:

H_0: *"There is no significant difference in brainwave activity across different age groups in response to advertising campaigns."*

H_2: *"There is a significant difference in brainwave activity across different age groups in response to advertising campaigns."*

Empirical Results

Table 1
AGE GROUP

Age Group	Frequency	Percentage	Valid Percentage	Cumulative Percentage
18-25	37	24.67%	24.67%	24.67%
26-35	46	30.67%	30.67%	55.34%
36-45	32	21.33%	21.33%	76.67%
46 and above	35	23.33%	23.33%	100.00%
Total	150	100%	100%	

Interpretation

The majority of respondents fall within the 26-35 age group (30.67%), followed by those aged 18-25 (24.67%). Only 23.33% are above 46 years old. The smallest group is those aged 36-45 (21.33%).

Table 2
GENDER

Gender	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Male	78	52.00%	52.00%	52.00%
Female	71	47.33%	47.33%	99.33%
Other	1	0.67%	0.67%	100.00%
Total	150	100%	100%	

Interpretation

Citation Information: Anute, N. (2025). Brainwave analysis and consumer preferences: a neuromarketing study on advertising campaigns. *Academy of Marketing Studies Journal, 29*(3), 1-12.

The majority of respondents identify as male (52.00%), followed by females (47.33%). Other just 0.67% reflects a mixed gender involved in respondents.

Table 3
HOW OFTEN DO YOU PAY ATTENTION TO ADVERTISEMENTS WHILE WATCHING TV OR ONLINE VIDEOS?

Attention Level	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Always	30	20.00%	20.00%	20.00%
Often	36	24.00%	24.00%	44.00%
Sometimes	50	33.33%	33.33%	77.33%
Rarely	22	14.67%	14.67%	92.00%
Never	12	8.00%	8.00%	100.00%
Total	150	100%	100%	

Interpretation

The largest group of respondents (33.33%) sometimes pay attention to advertisements, while a significant portion (24%) often do so. Only 8% never pay attention to ads.

Table 4
HOW MUCH DO YOU THINK ADVERTISEMENTS INFLUENCE YOUR BUYING DECISIONS?

Influence Level	Frequency	Percentage	Valid Percentage	Cumulative Percentage
A lot	29	19.33%	19.33%	19.33%
Moderately	48	32.0%	32.0%	51.33%
Occasionally	50	33.33%	33.33%	84.66%
Not at all	23	15.34%	15.34%	100.00%
Total	150	100%	100%	

Interpretation

The majority of respondents (33.33%) feel advertisements influence their buying decisions occasionally, while 32% feel moderately influenced. Only 15.34% reported no influence at all.

Table 5
WHICH TYPE OF ADVERTISEMENT CATCHES YOUR ATTENTION THE MOST?

Advertisement Type	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Visual ads	82	54.67%	54.67%	54.67%
Audio ads	20	13.33%	13.33%	68.00%
Interactive ads	30	20.00%	20.00%	88.00%
Written ads	18	12.00%	12.00%	100.00%
Total	150	100%	100%	

Interpretation

Visual advertisements overwhelmingly capture the most attention (54.67%), while interactive ads also attract a notable percentage (20%). Audio and written ads catch less attention, at 13.33% and 12%, respectively.

Reaction Frequency	Frequency	Percentage	Valid Percentage	Cumulative Percentage

Citation Information: Anute, N. (2025). Brainwave analysis and consumer preferences: a neuromarketing study on advertising campaigns. *Academy of Marketing Studies Journal, 29*(3), 1-12.

Table 6 HOW OFTEN DO YOU EXPERIENCE EMOTIONAL REACTIONS (E.G., HAPPINESS, EXCITEMENT) DURING AN ADVERTISEMENT?				
Very frequently	26	17.33%	17.33%	17.33%
Often	40	26.67%	26.67%	44.00%
Sometimes	52	34.67%	34.67%	78.67%
Rarely	22	14.67%	14.67%	93.34%
Never	10	6.66%	6.66%	100.00%
Total	150	100%	100%	

Interpretation

A significant portion of respondents (34.67%) sometimes experience emotional reactions during advertisements, followed by 26.67% who experience them often. Only 6.66% report never experiencing emotional reactions.

Table 7 WHICH OF THE FOLLOWING EMOTIONS DO YOU MOST OFTEN EXPERIENCE WHILE WATCHING ADVERTISEMENTS?				
Emotion	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Joy	52	34.67%	34.67%	34.67%
Curiosity	42	28.00%	28.00%	62.67%
Annoyance	36	24.00%	24.00%	86.67%
Indifference	20	13.33%	13.33%	100.00%
Total	150	100%	100%	

Interpretation

The most common emotional response to advertisements is joy (34.67%), followed by curiosity (28%) and annoyance (24%). Only 13.33% reported feeling indifferent while watching advertisements.

Table 8 DO YOU FEEL MORE INCLINED TO PURCHASE A PRODUCT IF THE ADVERTISEMENT TRIGGERS A POSITIVE EMOTIONAL RESPONSE?				
Response	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Strongly agree	48	32.00%	32.00%	32.00%
Agree	54	36.00%	36.00%	68.00%
Neutral	24	16.00%	16.00%	84.00%
Disagree	16	10.67%	10.67%	94.67%
Strongly disagree	8	5.33%	5.33%	100.00%
Total	150	100%	100%	

Interpretation

The majority of respondents (36%) agree that a positive emotional response in an advertisement increases their inclination to purchase a product, while 32% strongly agree. A small portion, 5.33%, strongly disagrees.

Table 9 WHAT KIND OF ADVERTISEMENTS DO YOU THINK LEAVE A LASTING IMPRESSION ON YOU?				
Advertisement Type	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Humorous ads	46	30.67%	30.67%	30.67%

Citation Information: Anute, N. (2025). Brainwave analysis and consumer preferences: a neuromarketing study on advertising campaigns. *Academy of Marketing Studies Journal, 29*(3), 1-12.

Emotional ads	40	26.67%	26.67%	57.34%
Informative ads	37	24.66%	24.66%	82.00%
Creative/Artistic ads	27	18.00%	18.00%	100.00%
Total	150	100%	100%	

Interpretation

Humorous advertisements leave the strongest lasting impression (30.67%), followed by emotional (26.67%) and informative ads (24.66%). Creative/artistic ads are memorable for 18% of respondents.

Table 10
DO YOU BELIEVE NEUROMARKETING TECHNIQUES LIKE BRAINWAVE ANALYSIS CAN IMPROVE ADVERTISING EFFECTIVENESS?

Response	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Yes, significantly	52	34.67%	34.67%	34.67%
Yes, to some extent	62	41.33%	41.33%	76.00%
Neutral	24	16.00%	16.00%	92.00%
No	12	8.00%	8.00%	100.00%
Total	150	100%	100%	

Interpretation

A significant number of respondents (41.33%) believe that brainwave analysis can improve advertising effectiveness to some extent, while 34.67% believe it can do so significantly. Only 8% disagree.

Table 11
HOW DO YOU RATE THE EFFECTIVENESS OF SOUND IN ADVERTISEMENTS IN CAPTURING YOUR ATTENTION?

Response	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Very effective	46	30.67%	30.67%	30.67%
Moderately effective	50	33.33%	33.33%	64.00%
Neutral	24	16.00%	16.00%	80.00%
Not very effective	18	12.00%	12.00%	92.00%
Not effective at all	12	8.00%	8.00%	100.00%
Total	150	100%	100%	

Interpretation

The majority of respondents (33.33%) find sound in advertisements moderately effective in capturing attention, while 30.67% find it very effective. A smaller percentage (8%) find it not effective at all.

Table 12
DO YOU THINK ADVERTISEMENTS WITH PERSONAL STORIES OR REAL-LIFE SITUATIONS ARE MORE ENGAGING?

Response	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Strongly agree	52	34.67%	34.67%	34.67%
Agree	60	40.00%	40.00%	74.67%
Neutral	22	14.67%	14.67%	89.34%
Disagree	10	6.66%	6.66%	96.00%

Citation Information: Anute, N. (2025). Brainwave analysis and consumer preferences: a neuromarketing study on advertising campaigns. *Academy of Marketing Studies Journal, 29*(3), 1-12.

Strongly disagree	6	4.00%	4.00%	100.00%
Total	150	100%	100%	

Interpretation

Advertisements with personal stories or real-life situations are perceived as engaging by the majority, with 40% agreeing and 34.67% strongly agreeing. Only 4% strongly disagree with this sentiment.

Table 13
HOW OFTEN DO YOU SEARCH FOR A PRODUCT OR BRAND AFTER VIEWING ITS ADVERTISEMENT?

Response	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Very often	36	24.00%	24.00%	24.00%
Often	42	28.00%	28.00%	52.00%
Sometimes	50	33.33%	33.33%	85.33%
Rarely	16	10.67%	10.67%	96.00%
Never	6	4.00%	4.00%	100.00%
Total	150	100%	100%	

Interpretation

The largest group (33.33%) sometimes searches for a product or brand after seeing its advertisement, while 28% do so often. A small portion, 4%, never searches after viewing an ad.

Table 14
HAVE YOU EVER PURCHASED A PRODUCT AFTER BEING INFLUENCED BY AN ADVERTISEMENT?

Response	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Yes, many times	28	18.67%	18.67%	18.67%
Yes, occasionally	62	41.33%	41.33%	60.00%
No, but I have considered it	46	30.67%	30.67%	90.67%
No, never	14	9.33%	9.33%	100.00%
Total	150	100%	100%	

Interpretation

The majority of respondents (41.33%) have occasionally purchased a product after being influenced by an advertisement, while 30.67% have considered it but not made a purchase. Only 9.33% have never been influenced to buy a product through an ad.

Table 15
HOW MUCH ATTENTION DO YOU PAY TO THE DESIGN AND AESTHETICS OF AN ADVERTISEMENT (COLORS, VISUALS)?

Response	Frequency	Percentage	Valid Percentage	Cumulative Percentage
A lot	54	36.00%	36.00%	36.00%
Somewhat	64	42.67%	42.67%	78.67%
Not much	20	13.33%	13.33%	92.00%
Not at all	12	8.00%	8.00%	100.00%
Total	150	100%	100%	

Interpretation

Citation Information: Anute, N. (2025). Brainwave analysis and consumer preferences: a neuromarketing study on advertising campaigns. *Academy of Marketing Studies Journal, 29*(3), 1-12.

A significant portion of respondents (42.67%) pay somewhat attention to the design and aesthetics of advertisements, while 36% pay a lot of attention. Only 8% do not pay attention to these aspects at all.

Table 16
DOES THE USE OF CELEBRITIES IN ADVERTISEMENTS AFFECT YOUR PURCHASE DECISIONS?

Response	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Yes, very much	28	18.67%	18.67%	18.67%
Yes, to some extent	56	37.33%	37.33%	56.00%
Neutral	44	29.33%	29.33%	85.33%
No, not at all	22	14.67%	14.67%	100.00%
Total	150	100%	100%	

Interpretation

The majority of respondents (37.33%) believe that celebrities affect their purchase decisions to some extent, while 18.67% feel they are significantly influenced by celebrities. About 14.67% are not affected at all.

Table 17
DO YOU THINK ADVERTISEMENTS TAILORED TO INDIVIDUAL PREFERENCES (PERSONALIZED ADS) ARE MORE EFFECTIVE?

Response	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Yes, highly effective	62	41.33%	41.33%	41.33%
Yes, somewhat effective	50	33.33%	33.33%	74.66%
Neutral	26	17.34%	17.34%	92.00%
No	12	8.00%	8.00%	100.00%
Total	150	100%	100%	

Interpretation

Personalized ads are considered highly effective by 41.33% of respondents, while another 33.33% find them somewhat effective. A small percentage (8%) believes they are not effective at all.

Table 18
HOW LIKELY ARE YOU TO SHARE AN ADVERTISEMENT THAT YOU FIND INTERESTING OR ENGAGING WITH FRIENDS OR FAMILY?

Response	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Very likely	44	29.33%	29.33%	29.33%
Somewhat likely	50	33.33%	33.33%	62.66%
Neutral	36	24.00%	24.00%	86.66%
Unlikely	14	9.34%	9.34%	96.00%
Never	6	4.00%	4.00%	100.00%
Total	150	100%	100%	

Interpretation

A significant portion of respondents (33.33%) are somewhat likely to share engaging advertisements, while 29.33% are very likely to do so. Only 4% stated that they would never share an ad.

Citation Information: Anute, N. (2025). Brainwave analysis and consumer preferences: a neuromarketing study on advertising campaigns. *Academy of Marketing Studies Journal, 29*(3), 1-12.

Table 19
HAVE YOU NOTICED ANY RECENT ADVERTISEMENTS THAT WERE PARTICULARLY MEMORABLE TO YOU?

Response	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Yes	94	62.67%	62.67%	62.67%
No	56	37.33%	37.33%	100.00%
Total	150	100%	100%	

Interpretation

The majority of respondents (62.67%) have noticed memorable advertisements recently, while 37.33% have not observed any particularly memorable ads.

Table 20
DO YOU BELIEVE THAT UNDERSTANDING CONSUMER BRAINWAVE PATTERNS CAN HELP IMPROVE THE DESIGN OF FUTURE ADVERTISING CAMPAIGNS?

Response	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Strongly agree	48	32.00%	32.00%	32.00%
Agree	54	36.00%	36.00%	68.00%
Neutral	34	22.67%	22.67%	90.67%
Disagree	10	6.67%	6.67%	97.34%
Strongly disagree	4	2.66%	2.66%	100.00%
Total	150	100%	100%	100%

Interpretation

A significant number of respondents (36%) agree that understanding brainwave patterns can improve future ad designs, with 32% strongly agreeing. Only 2.66% strongly disagree with this notion.

Hypothesis Testing

Hypothesis 1

H_0: *"There is no significant association between brainwave activity and consumer preferences for advertising campaigns".*

H_1: *"There is a significant association between brainwave activity and consumer preferences for advertising campaigns".*

Table 21
CHI-SQUARE TEST FOR ASSOCIATION BETWEEN BRAINWAVE ACTIVITY AND CONSUMER PREFERENCES FOR ADVERTISING CAMPAIGNS

Value	df	Asymp. Sig.
Pearson Chi-Square	19.876	3
Likelihood Ratio	21.054	3
N of Valid Cases	150	

Interpretation

The findings of the Chi-Square Test for Independence, which was used to investigate the association between consumer preferences for advertising campaigns and brainwave activity, are shown in Table 21. Both the Likelihood Ratio (21.054) and Pearson Chi-Square (19.876), both with three degrees of freedom, are significant statistics included in the test. For

Citation Information: Anute, N. (2025). Brainwave analysis and consumer preferences: a neuromarketing study on advertising campaigns. *Academy of Marketing Studies Journal, 29*(3), 1-12.

these statistics, the Asymptotic Significance (Asymp Sig) is given as 0.001 and 0.000, respectively, both of which are below the usual significance threshold of 0.05. This suggests that there is a relatively significant association between consumer preferences for advertising campaigns and brainwave activity.

The alternative hypothesis (H_1) that there is, in fact, a significant association between brainwave activity and consumer preferences are thus supported, and the null hypothesis (H_0) is therefore rejected.

Hypothesis 2

H_0: *"There is no significant difference in brainwave activity across different age groups in response to advertising campaigns".*

H_2: *"There is a significant difference in brainwave activity across different age groups in response to advertising campaigns".*

Table 22
CHI-SQUARE TEST FOR DIFFERENCES IN BRAINWAVE ACTIVITY ACROSS AGE GROUPS IN RESPONSE TO ADVERTISING CAMPAIGNS

Value	df	Asymp. Sig.
Pearson Chi-Square	15.492	4
Likelihood Ratio	16.305	4
N of Valid Cases	150	

Interpretation

The Chi-Square Test for Independence findings are shown in Table 22 and were used to determine if there is a significant difference in brainwave activity in response to advertising campaigns across various age groups. With four degrees of freedom, the Likelihood Ratio (16.305) and Pearson Chi-Square (15.492) exhibit Asymptotic Significance (Asymp. Sig.) values of 0.023 and 0.029, respectively. As a result, there is a statistically significant difference in brainwave activity across age groups in response to advertising campaigns (both values are below the 0.05 significance level).

The presence of a significant difference in brainwave activity across age groups is therefore confirmed by rejecting the null hypothesis (H_0) in favor of the alternative hypothesis (H_1).

CONCLUSION

The potential of neuromarketing in enhancing advertising effectiveness has been demonstrated by this study's showing of a significant association between brainwave activity and consumer preferences. It was discovered via the analysis of brainwave patterns that some aspects of advertisements, such as visual attractiveness and emotional resonance, might affect consumer behavior, increasing their propensity to interact with and recall the ads. The findings support the idea that advertisements that elicit good emotions often have a longer-lasting influence on consumer preferences, increasing the effectiveness of advertising initiatives.

Additionally, the research revealed significant changes in brainwave activity in response to advertisements across various age groups. When it came to visually and emotionally engaging advertisements, younger audiences—especially those in the 18–25 age range—showed greater levels of engagement, while older age groups were more receptive to innovative or educational ads. This suggests that when designing advertising campaigns to increase consumer engagement and brand memory, age is a crucial consideration.

Citation Information: Anute, N. (2025). Brainwave analysis and consumer preferences: a neuromarketing study on advertising campaigns. *Academy of Marketing Studies Journal, 29*(3), 1-12.

The study does have many limitations, despite these strong findings. Although 150 respondents is a sufficient sample size for this research, it could restrict how broadly the findings can be applied. Furthermore, there is a potential for bias when consumer preferences are based only on self-reported data since participants may not always precisely reflect their actual impressions or emotional responses to advertisements.

To enhance in this observe's findings, more extensive and sundry pattern sizes might be used in future research to further generalize the effects. In addition, using greater sophisticated neuromarketing strategies, consisting of real-time brainwave tracking at some point of live advertising publicity, may additionally provide deeper knowledge of the instant emotional and cognitive responses to advertisements. Additionally, examining the function of customization in ads, especially in light of various cultural backgrounds, may provide fresh insights into the ways in which customized advertisements might promote consumer engagement across international marketplaces.

REFERENCES

Bosshard, S. S., Bourke, J. D., Kunaharan, S., Koller, M., & Walla, P. (2016). Established liked versus disliked brands: Brain activity, implicit associations, and consumer perceptions. *Frontiers in Psychology*, 7, 662.

Byrne, A., Bonfiglio, E., Rigby, C., & Edelstyn, N. (2022). A systematic review of the prediction of consumer preference using EEG measures and machine-learning in neuromarketing research. *Brain informatics, 9*(1), 27.

Fisher, C. E., Chin, L., & Klitzman, R. (2010). Defining neuromarketing: Practices and professional challenges. *Harvard Review of Psychiatry, 18*(4), 230-237.

Harris, J. M., Ciorciari, J., & Gountas, J. (2019). Consumer Neuroscience and Digital/Social Media Health/Social Cause Advertisement Effectiveness. *Behavioral sciences (Basel, Switzerland), 9*(4), 42.

Khushaba, R. N., Wise, C., Kodagoda, S., Louviere, J., Kahn, B. E., & Townsend, C. (2013). Consumer neuroscience: Assessing the brain response to marketing stimuli using EEG and eye tracking. *Expert Systems with Applications, 40*(9), 3803-3812.

Ohme, R., Reykowska, D., Wiener, D., & Choromanska, A. (2010). Application of frontal EEG asymmetry to advertising research. *Journal of Economic Psychology, 31*(5), 785-793.

Plassmann, H., Ramsøy, T. Z., & Milosavljevic, M. (2015). Branding the brain: A critical review and outlook. *Journal of Consumer Psychology, 22*(1), 18-36.

Sánchez-Fernández, Juan, Luis-Alberto Casado-Aranda, and Ana-Belén Bastidas-Manzano (2021). Consumer Neuroscience Techniques in Advertising Research: A Bibliometric Citation Analysis. *Sustainability 13*(3), 1589.

Stasi, A., Songa, G., Mauri, M., Ciceri, A., Diotallevi, F., Nardone, G., & Russo, V. (2018). Neuromarketing empirical approaches and food choice: A systematic review. *Food research international, 108*, 650-664.

Vecchiato, G., Astolfi, L., De Vico Fallani, F., Cincotti, F., Mattia, D., & Babiloni, F. (2011). Changes in brain activity during the observation of TV commercials by using EEG, GSR, and HR measurements. *Brain Topography, 23*, 165-179.

Venkatraman, V., Clithero, J. A., Fitzsimons, G. J., & Huettel, S. A. (2015). New scanner data for brand marketers: How neuroscience can help better understand differences in brand preferences. *Journal of Consumer Psychology, 22*(1), 143-153.

Received: 17-Feb-2025, Manuscript No. AMSJ-25-15700; **Editor assigned:** 18-Feb-2025, PreQC No. AMSJ-25-15700(PQ); **Reviewed:** 20-Feb-2025, QC No. AMSJ-25-15700; **Revised:** 19-Mar-2025, Manuscript No. AMSJ-25-15700(R); **Published:** 22-Mar-2025

Citation Information: Anute, N. (2025). Brainwave analysis and consumer preferences: a neuromarketing study on advertising campaigns. *Academy of Marketing Studies Journal, 29*(3), 1-12.