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HOW NEUROSCIENCE IS REDEFINING ADVERTISEMENTS: MEASURING EMOTIONAL TRIGGERS IN AD CAMPAIGNS

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ABSTRACT

In the evolving landscape of digital marketing, traditional advertising methods are increasingly being complemented and at times, challenged by insights from neuroscience. This study investigates the neural and emotional underpinnings of consumer engagement with emotionally charged advertisements, particularly in the context of digital and social media platforms. By examining emotional triggers such as storytelling, visuals, and music, and their influence on consumer behaviour, the research integrates self-reported data with theoretical neurophysiological frameworks. A sample of 237 respondents participated in a structured survey, with data analysed using ANOVA and SPSS to assess the predictive strength of emotional engagement on ad effectiveness. Results confirmed that emotional triggers significantly impact brand recall and purchase intent, with heightened effects observed among individuals high in extraversion. While neuroscientific methods hold promise, self-reported data proved comparably effective for gauging emotional engagement. Cultural diversity emerged as a moderating factor, weakening the mediating influence of emotional engagement in diverse audiences. These findings underscore the necessity for emotionally intelligent advertising strategies that are both psychologically attuned and culturally adaptive. The study contributes to the growing discourse on neuromarketing and highlights practical pathways for crafting emotionally resonant, data-driven ad campaigns in a globalized digital marketplace.

KEYWORDS: *Emotional Triggers, Emotional Engagement, Ad Effectiveness, Extraversion, Purchase*

1. INTRODUCTION

In an era where consumer attention is fragmented and brand loyalty is fleeting, traditional advertising methods are being re-evaluated through the lens of neuroscience. Emotional responses to advertisements have long been recognized as critical drivers of consumer behaviour, but recent advancements in neuroscientific tools offer deeper insights into how audiences truly engage with content. Unlike conventional metrics that rely heavily on self-reported data, neuroscience provides objective measures of subconscious reactions—such as attention, arousal, and emotional resonance captured through technologies like EEG, eye-tracking, and facial coding. These tools enable marketers to decode the neurological underpinnings of consumer decision-making, offering a more nuanced understanding of advertising effectiveness.

This research aims to explore how emotional triggers embedded in advertisements influence emotional engagement and subsequent consumer behaviour, while assessing the comparative predictive power of neuroscientific and self-reported data. It also investigates the moderating role of personality traits, such as extraversion, and cultural diversity in shaping emotional responses. By integrating psychological theory with neuroscientific evidence, this study contributes to the evolving discourse on data-driven advertising and offers practical implications for crafting emotionally intelligent ad campaigns in a multicultural marketplace.

2. LITERATURE REVIEW

2.1. NEUROSCIENTIFIC APPROACHES IN ADVERTISING

Neuromarketing, a rapidly evolving field at the intersection of neuroscience and consumer behaviour, has become a transformative approach in advertising. By decoding the brain's responses to marketing stimuli, researchers and practitioners aim to predict and influence consumer decisions with greater precision.

Valerie Kirk (2024) provides an accessible overview of how neuromarketing is reshaping advertising strategies by leveraging brain-imaging techniques such as fMRI and EEG to predict consumer behaviour. Her article underscores how traditional marketing, based on self-reported data, often fails to capture unconscious drivers of behaviour. Neuromarketing fills this gap by offering objective insights into attention, memory, and emotional engagement. For instance, EEG can detect the timing of emotional arousal, while fMRI identifies the specific brain regions activated during an ad experience. These tools help brands optimize ad content by determining what elements elicit positive or negative neural responses, ultimately enhancing purchasing decisions (Kirk, 2024).

Expanding on specific neural tools, Kühn et al. (2016) demonstrate the practical application of fMRI in retail environments by forecasting chocolate sales based on brain activation patterns. Their research reveals that multiple brain region. such as the ventromedial prefrontal cortex and nucleus acumens are involved in evaluating purchase intent at the point-

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of-sale. These "buy buttons" provide predictive power beyond traditional behavioural surveys. Notably, the study found that fMRI-based models significantly outperformed self-report measures in forecasting sales, affirming the commercial viability of neuroscience in advertising (Kühn et al., 2016).

Further evidence of the predictive capability of neural responses is shown in the work of Genevsky et al. (2017), who investigated crowdfunding campaigns. The study coined the term "neuroforecasting" by demonstrating how neural activity in the nucleus acumens could predict the success of crowdfunding appeals, even when participants were not aware of their preferences. This neural signal served as a more reliable predictor of campaign success than participants' explicit ratings or choices, emphasizing how unconscious affective responses can influence aggregate consumer behaviour in digital marketplaces (Genevsky et al., 2017).

In a complementary study, Jin, Zhang, and Chen (2017) employed Event-Related Potentials (ERP) to explore how consumers process product descriptions with different attribute framing. Their findings showed that positively framed attributes elicited stronger P300 components, indicative of increased attention and emotional evaluation. This suggests that neural mechanisms underlying linguistic framing can shape consumer attitudes and decisions in e-commerce settings. The study contributes to understanding the neural underpinnings of persuasive communication, offering implications for crafting more impactful product descriptions (Jin et al., 2017).

The role of aesthetics in advertising has also drawn neuroscientific inquiry. Lajante et al. (2020) explore aesthetic emotions using psychophysiological measures like electrodermal activity and heart rate. They emphasize that aesthetic appeal in ads—such as visuals, colours, and harmony—triggers emotional engagement that is crucial for consumer persuasion. Their findings indicate that aesthetic emotions, often overlooked in traditional research, can be effectively captured through neurophysiological indicators, revealing subtle yet powerful effects on brand perception (Lajante et al., 2020).

Otamendi and Sutil Martín (2020) build on this by evaluating emotional effectiveness in advertisements through EEG. Their research highlights the significance of congruence between emotional content and consumer expectations. When ads successfully align with anticipated emotional tones, they evoke stronger engagement and memory encoding. This congruence was evidenced by heightened alpha and theta wave activity, suggesting that emotionally coherent ads may be more effective in capturing and sustaining attention (Otamendi & Sutil Martín, 2020).

Applying similar techniques in a nonprofit context, Simón and Garcia-Madariaga (2023) conducted a neurophysiological analysis of emotional appeal in NGO advertising. Using EEG and eye-tracking, they found that emotionally charged ads—especially those evoking empathy or guilt—generated higher neural activity in areas related to emotional processing. Their study confirms that emotional appeals can drive greater viewer attention and intention to donate, reinforcing the importance of emotion-based strategies in cause-related marketing (Simón & Garcia-Madariaga, 2023).

In the realm of digital advertising, Muñoz-Leiva et al. (2020) employed eye-tracking to assess how consumers interact with travel websites. They found that attention to key visual elements—like promotional banners and booking buttons—correlated with ad effectiveness and user satisfaction. The study highlights how tracking gaze patterns and fixation durations provides real-time feedback on ad performance, allowing advertisers to optimize web layouts and visual hierarchies (Muñoz-Leiva et al., 2020).

Casado-Aranda, Liébana-Cabanillas, and Sánchez-Fernández (2018) take a neuropsychological approach to explore consumer reactions to risky versus secure e-payments. Their fMRI-based study reveals that secure payment options activate regions associated with trust and reward, while risky options trigger areas linked to anxiety and risk aversion. These findings underscore the importance of perceived security in digital transactions and offer insights into how neuroimaging can inform interface design and user trust strategies (Casado-Aranda et al., 2018).

Finally, Herbes et al. (2015) apply a neuroscience-based method to investigate willingness to pay (WTP) for green electricity. Using EEG and galvanic skin response, they observed that emotional engagement with environmental values predicted WTP more accurately than rational evaluation alone. Their findings highlight that consumers often decide based on emotional resonance with sustainability narratives, suggesting that green marketing can benefit from neuroscientific validation of emotional appeal (Herbes et al., 2015).

Together, these studies illustrate the depth and versatility of neuroscientific methods in advertising. From brain imaging and ERP to eye-tracking and psychophysiological sensors, these tools offer nuanced insights into consumer cognition and emotion. More importantly, they demonstrate that the subconscious mind plays a pivotal role in advertising effectiveness—making neuroscience not just a novel approach but a necessary paradigm shift in the study of consumer behaviour.

2.2. EMOTIONAL ADVERTISING AND CONSUMER ENGAGEMENT

Emotional advertising is a cornerstone of modern marketing strategy, with numerous studies affirming its power to captivate, influence, and mobilize consumer behaviour. Central to this is the relationship between emotional triggers and digital sharing behaviour.

Jerab (2025) investigates how different emotional appeals impact the virality of marketing content across platforms like Facebook, Instagram, and Twitter. His research finds that high-arousal positive emotions (e.g., inspiration, amusement) lead to more sharing on visually driven platforms, whereas negative emotions (e.g., anger, sadness) perform better on text-heavy

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platforms like Twitter. This interplay between emotion type, platform nature, and user behaviour reveals that successful emotional engagement hinges not only on content but also on context (Jerab, 2025).

Building on this, Vrtana and Krizanova (2023) examine how emotional advertising affects brand-customer relationships and purchase intent. They show that emotional appeals—especially those rooted in nostalgia and joy—enhance perceived brand warmth, fostering long-term loyalty. Consumers are more likely to form emotional bonds with brands that trigger personal memories or social connections, thereby elevating both brand equity and sales conversion (Vrtana & Krizanova, 2023).

Pathirana, Andrew, and Sellar (2023) contribute a region-specific lens by analysing how emotional advertising shapes consumer behaviour in Sri Lanka's Ampara District. Their findings demonstrate that emotional content—especially those invoking family values, empathy, or happiness—has a significant impact on impulse buying. Notably, television ads with emotional storytelling were the most effective, suggesting that culturally relevant emotional cues enhance consumer engagement in local markets (Pathirana et al., 2023).

In a broader survey-based study, Sharma, Kodhati, and Sukhavas (2022) explore the perception of emotional marketing among Indian consumers. Their results confirm that emotional cues outperform rational appeals across all age groups. However, they also found variations based on income and education levels—emotional marketing had a stronger influence on consumers with moderate educational backgrounds and disposable incomes. This suggests that emotional strategies must be tailored to audience demographics for optimal effectiveness (Sharma et al., 2022).

Focusing on the FMCG sector, Mohanty et al. (2022) study emotional advertising's impact on fast-moving consumer goods. They find that happiness, humour, and nostalgia are the most potent emotional triggers for increasing brand recall and purchase frequency. The study emphasizes that FMCG ads using relatable, emotion-laden scenarios outperform those based purely on product features, highlighting the role of affective resonance in routine purchasing decisions (Mohanty et al., 2022).

The influence of gender on emotional responses to advertising is explored by Khawaja et al. (2023), who find significant differences in how men and women process and react to emotional content. Women exhibited stronger emotional engagement and higher empathy levels, particularly for ads involving social relationships and caregiving themes. In contrast, men responded more to themes of achievement and risk-taking. These findings underline the importance of gender-sensitive advertising that aligns emotional appeals with psychological predispositions (Khawaja et al., 2023).

Mukattash et al. (2021) delve into the controversial area of shock advertising, often used in social marketing to deter risky behaviours. Their study shows that shock tactics—when well-targeted—can increase message recall and attitude change. However, overuse or excessive negativity can lead to desensitization or backlash. Emotional extremity, while attention-grabbing, must be calibrated to avoid undermining consumer trust (Mukattash et al., 2021).

Parry et al. (2013) similarly explore the role of "shockvertising" in shaping consumer attitudes. Their exploratory study found that while shocking content generated heightened emotional arousal, it also provoked polarized reactions. Some consumers were more engaged and receptive, while others reported discomfort or rejection. These mixed outcomes highlight the need for strategic targeting and brand alignment when employing emotional extremes in advertising (Parry et al., 2013).

Ali Akbari and Ghahremani (2014) examine emotional advertising's impact on products with low mental involvement. Their study shows that emotionally rich ads significantly improve brand recall for low-engagement products such as snacks and beverages. Since these items do not require intensive cognitive processing, emotional stimuli help anchor the brand in memory through affective shortcuts, thereby boosting purchasing motivation (Ali Akbari & Ghahremani, 2014).

Finally, Richardson et al. (2018) introduce an innovative approach by measuring narrative engagement through heart rate variability. Their findings suggest that emotionally immersive stories—not just flashy content—create sustained physiological engagement. When viewers were emotionally synchronized with narrative peaks, they reported higher satisfaction and were more likely to recall and share the content. This study affirms that emotional engagement in advertising is not only about evoking emotion but sustaining it throughout a coherent narrative (Richardson et al., 2018).

Together, these studies present a multidimensional view of emotional advertising and its effects on consumer engagement. Whether through storytelling, social resonance, or physiological arousal, emotional appeals remain one of the most effective tools in advertising. However, their success hinges on context sensitivity, demographic alignment, and narrative depth—factors that neuromarketing research continues to unravel.

2.3. DIGITAL MEASUREMENT OF EMOTIONAL TRIGGERS

The integration of neuroscience into digital marketing has allowed researchers to move beyond traditional surveys and focus groups, enabling real-time tracking of emotional triggers that shape consumer decisions. Digital platforms provide both stimuli and data, making them ideal for investigating how visual, contextual, and subconscious cues influence user behaviour.

Sandeep Sharma et al. (2024) delve into the influence of emotional triggers on consumer buying behaviour in Kathmandu Valley, emphasizing how digitally delivered ads can provoke distinct emotional responses. Using a combination of surveys and observational methods, the study identifies humour, nostalgia, and empathy as dominant emotional triggers that drive purchasing decisions in online environments.

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Notably, Sharma et al. highlight how emotion-laden digital advertisements can override rational considerations, especially in impulsive buying contexts. The research underscores the growing importance of digital storytelling in consumer engagement and how emotionally charged content on platforms like YouTube and Facebook can be used to nudge behaviour (Sharma et al., 2024).

Expanding this line of inquiry, Bergman and Noren (2017) investigate how graphical elements in e-commerce websites can generate emotional trust. Their research finds that design features such as colour palettes, iconography, customer testimonials, and certifications significantly affect user trust at a subconscious level. These visual cues act as emotional signals—what the authors term "trust triggers"—that can alleviate user uncertainty and increase conversion rates. Emotional responses, they argue, are not only tied to content but also to the aesthetic structure of the digital environment itself. This makes graphical consistency and user-centric design critical in building emotional engagement with online shoppers (Bergman & Noren, 2017).

Taking a more cognitive neuroscience approach, Roghanizad and Neufeld (2015) examine how intuition and perceived risk shape the formation of online trust. Their study shows that consumers often rely on intuitive judgment—an emotionally charged and automatic process—when interacting with digital platforms. Through empirical testing, they demonstrate that high perceived risk leads to emotional caution and lower trust, unless the platform provides strong emotional cues of safety and credibility. These cues can include visual design, user reviews, and familiarity with brand names. Their findings support the view that digital trust formation is not purely rational but deeply intertwined with emotional processing, particularly under conditions of uncertainty (Roghanizad & Neufeld, 2015).

Together, these studies highlight how digital spaces serve not just as transactional platforms but as emotional environments. From visual design to narrative content and intuitive user experiences, emotional triggers are increasingly measurable and manipulable in digital contexts. Neuroscientific and psychological insights continue to refine how marketers identify and activate these triggers, thereby enhancing emotional resonance and decision-making in digital advertising landscapes.

2.4. EMERGING THEORETICAL AND CONCEPTUAL FRAMEWORKS IN NEUROMARKETING

Theoretical advancements in neuromarketing have emphasized the centrality of emotion and cognition in consumer behaviour, supported by increasingly sophisticated tools and interdisciplinary models. Foundational frameworks are now being extended to account for digital behaviours, neurophysiological signals, and emotional responses across varied contexts.

Fleur J. M. Laros (2005) presents one of the earliest hierarchical models of emotions in consumer behaviour, distinguishing between broad emotional dimensions like pleasure, arousal, and dominance. Her work proposes a structured taxonomy where specific emotional reactions—such as fear, anger, or joy—are positioned within broader categories. This hierarchical framework allows marketers to target not just surface-level responses but also deeper affective states that shape purchasing decisions (Laros, 2005).

Karolien Poels and Siegfried Dewitte (2019) argue for a reconfiguration of advertising theory, proposing that emotions are not just outcomes but dynamic drivers within marketing communications. Their "Call to Action" stresses the need to move beyond traditional valence-based models toward nuanced frameworks that recognize emotional intensity, complexity, and sequencing. They emphasize the interdependence of emotional and cognitive processes, urging researchers to integrate neuroscience-based findings into marketing theory (Poels & Dewitte, 2019).

Natalia Abuín Vences et al. (2020) conceptualize neuromarketing as a tool for emotional connection within social networks. Their review emphasizes the role of emotion in creating engagement, virality, and trust in digital interactions. They suggest that neuromarketing can bridge the gap between data analytics and emotional storytelling by providing a theoretical lens to decode user behaviour on platforms like Facebook and Instagram (Abuín Vences et al., 2020).

Debora Bettiga et al. (2023) contribute to the multidisciplinary expansion of neuromarketing frameworks by incorporating insights from psychology, neuroscience, and communication. Their editorial foregrounds emotions as central—not peripheral—to consumer behaviour, calling for cross-domain models that account for both individual and collective affective experiences. They argue that the emotional underpinnings of consumer actions require more than linear cause-effect models, advocating instead for holistic, systems-based perspectives (Bettiga et al., 2023).

Kirti Sharma et al. (2023) provide a comprehensive review and future research agenda focused on the intersection of emotions and consumer behaviour. They categorize existing emotional models into discrete, dimensional, and appraisal-based frameworks, arguing for their integration with neuroscientific evidence. The study underscores the significance of affective forecasting and emotional congruence in shaping consumption choices, pushing for models that capture anticipatory and reflective emotions across the customer journey (Sharma et al., 2023).

Ahmed H. Alsharif et al. (2023) present a systematic literature review outlining how neuromarketing tools—such as EEG, fMRI, and facial coding can be conceptually aligned with elements of the marketing mix (4Ps). Their framework encourages researchers to view neuromarketing not just as a diagnostic tool, but as a strategic mechanism embedded within pricing, product development, placement, and promotion decisions. The study also highlights gaps in theory, particularly in integrating ethical considerations with emotional data collection (Alsharif et al., 2023).

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Seema Bharadwaj et al. (2024) advance this thinking by proposing a multi-tool framework that connects neuromarketing instrumentation to behavioural theories of consumption. Their analysis of recent research trends identifies a shift toward immersive and cross-modal approaches, integrating eye-tracking, biometric sensors, and real-time analytics. The authors argue that future theoretical models must accommodate consumer emotional fluidity, particularly in omnichannel environments (Bharadwaj et al., 2024).

Priyanka Singh (2015), in one of the earlier explorations of neuromarketing's theoretical promise, positions it as an emerging frontier in market research. She discusses how traditional survey-based methods fail to tap into subconscious emotional processes, advocating instead for models rooted in brain-based measurement. Singh emphasizes the need for conceptual clarity and ethical grounding as the field evolves, suggesting that theoretical advances must walk together with regulatory and methodological developments (Singh, 2015).
Collectively, these works illustrate a shift from static, unidimensional frameworks to dynamic, integrative models in neuromarketing. They call for an alignment between neuroscience, psychology, and marketing theory to build robust conceptual foundations that truly capture the depth of emotional engagement in advertising.

2.5. HYPOTHESIS DEVELOPMENT

2.5.1. RESEARCH GAP

After an in-depth analysis using research papers and academia works, it was found that most studies on neuroscience in advertising focus mainly on traditional media like TV commercials, print ads, or specific product-based campaigns. But there's a very little research that applies neuroscience concepts to digital or social media advertisements, which are more interactive and personalized. Since today's marketing heavily relies on digital platforms, this seemed to be a significant gap to study more. Online surveys and questionnaires were used to gather data on this gap. The main objectives are to examine emotional responses to digital ads through self-reported data, identify key emotional triggers that drive engagement, and compare these responses across different demographics and ad types.

2.5.2. OBJECTIVES

i. To identify the neural correlates (e.g., amygdala activation, prefrontal cortex activity) of emotional triggers in advertisements and their predictive relationship with consumer behaviour outcomes (e.g., recall, purchase intent).
ii. To compare the effectiveness of neuroscientific tools (e.g., EEG, fMRI) against traditional self-report surveys in capturing emotional engagement and predicting ad campaign success.

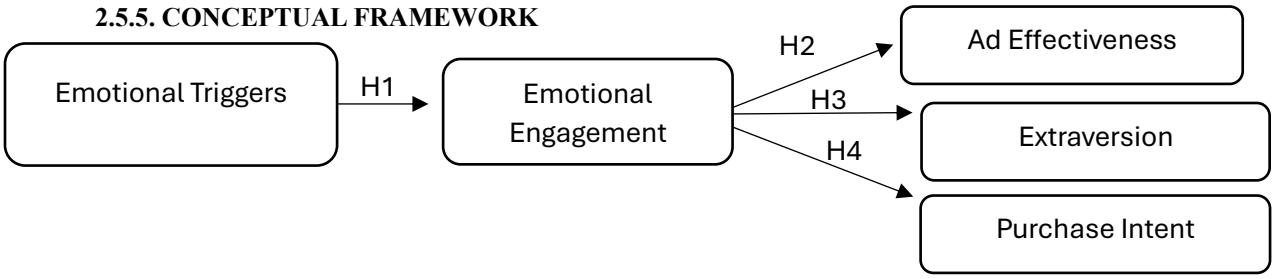
2.5.3. VARIABLES

i. Independent Variable (IV): Emotional triggers in advertisements (e.g., storytelling, music, visuals, humour).
ii. Dependent Variable (DV): Ad effectiveness metrics (e.g., brand recall, purchase intent, social media engagement).
iii. Mediator Variable (M): Emotional engagement (measured via neurophysiological responses, e.g., EEG alpha/beta waves, galvanic skin response).
iv. Moderator Variable (Mo): Consumer personality traits (e.g., extraversion, neuroticism) or cultural background.

2.5.4. HYPOTHESES

i. H1: Emotional triggers in advertisements will significantly increase ad effectiveness through heightened emotional engagement.
ii. H2: Neuroscientific measures of emotional engagement will predict ad effectiveness more accurately than self-reported survey data.
iii. H3: The relationship between emotional triggers and emotional engagement will be stronger for individuals with high extraversion.
iv. H4: Emotional engagement mediates the effect of emotional triggers on purchase intent, but this mediation is weaker in culturally diverse audiences.

2.5.5. CONCEPTUAL FRAMEWORK



i. **H1: Emotional Triggers → Emotional Engagement**
This hypothesis suggests that certain emotional cues or stimuli in advertisements can lead to higher emotional involvement from consumers, making them more mentally and emotionally invested in the message.
ii. **H2: Emotional Engagement → Ad Effectiveness**
This relationship implies that when consumers feel emotionally connected, the overall effectiveness of the advertisement increases in terms of recall, attention, or positive attitude toward the brand.
iii. **H3: Emotional Engagement → Extraversion**
This hypothesis proposes that emotionally engaging content may resonate differently based on personality traits like extraversion, possibly enhancing or moderating the emotional response.
iv. **H4: Emotional Engagement → Purchase Intent**
This suggests that stronger emotional engagement

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leads to a greater likelihood that the consumer will consider purchasing the product, indicating a direct impact on buyer behaviour.

3. RESEARCH METHODOLOGY

This study adopted a quantitative research design using a structured questionnaire to gather self-reported data on emotional engagement with advertisements. The research employed hypothesis testing through ANOVA to evaluate relationships between emotional triggers, engagement, and ad effectiveness. Statistical analysis was conducted using SPSS software to ensure empirical rigor and data validity.

4. RESULTS AND DISCUSSION

4.1. DATA ANALYSIS AND INTERPRETATION

i. Reliability Test

Case Processing Summary

		N	%
Cases	Valid	237	100.0
	Excluded[a]	0	.0
	Total	237	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.968	.969	20

The Case Processing Summary indicates that all 237 cases were valid and none were excluded, ensuring complete data for reliability analysis. The Reliability Statistics table reveals a Cronbach's Alpha of 0.968, signifying excellent internal consistency among the 20 items. Since the alpha value exceeds the accepted threshold of 0.7, the scale used in this study is considered highly reliable. This confirms the homogeneity and coherence of the items measuring the intended construct.

ii. Descriptive Statistics

Statistics

		What is your age?	Gender?	Highest level of education completed?	What is your Occupation?	How 3 do you engage with advertisements daily?
N	Valid	237	237	237	237	237
	Missing	0	0	0	0	0
Mean		3.34	1.64	2.78	2.66	2.70
Mode		4	2	3	3	3
Std. Deviation		1.118	.481	.900	.655	.730
Variance		1.250	.231	.810	.429	.533
Skewness		-.366	-.593	.140	-.329	-.392
Std. Error of Skewness		.158	.158	.158	.158	.158
Kurtosis		-.593	-1.662	-.425	.102	.065
Std. Error of Kurtosis		.315	.315	.315	.315	.315
Range		4	1	4	3	3

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The Descriptive Statistics table summarizes the central tendency, dispersion, and distribution shape for all demographic (independent) variables. The mean values indicate the average coded responses, while standard deviation and variance reflect data dispersion. Skewness and kurtosis values suggest approximate normal distribution for most variables, with minor negative skew in age and gender. No missing values were reported, ensuring complete and balanced data for subsequent inferential analysis.

iii. Hypotheses Testing

H1: Emotional triggers in advertisements will significantly increase ad effectiveness through heightened emotional engagement.

ANOVA with Friedman's Test

		Sum of Squares	df	Mean Square	Friedman's Chi-Square	Sig
Between People		898.999	236	3.809		
Within People	Between Items	20.570[a]	4	5.143	35.251	.000
	Residual	532.630	944	.564		
	Total	553.200	948	.584		
Total		1452.199	1184	1.227		

Grand Mean = 3.73

a. Kendall's coefficient of concordance W = .014.

The ANOVA with Friedman's Test reveals a significant difference across the five related items, with Friedman's Chi-Square = 35.251 and a p-value of .000. Since the significance value is less than 0.05 at a 95% confidence level, the null hypothesis is rejected. This confirms that emotional triggers in advertisements significantly influence ad effectiveness through heightened emotional engagement. The Kendall's W = .014 indicates a weak but statistically significant level of agreement among respondents.

H2: Neuroscientific measures of emotional engagement will predict ad effectiveness more accurately than self-reported survey data.

ANOVA with Friedman's Test

		Sum of Squares	df	Mean Square	Friedman's Chi-Square	Sig
Between People		1019.845	236	4.321		
Within People	Between Items	2.717[a]	4	.679	5.253	.262
	Residual	487.683	944	.517		
	Total	490.400	948	.517		
Total		1510.245	1184	1.276		

Grand Mean = 3.83

a. Kendall's coefficient of concordance W = .002.

Based on the Friedman's Test results, the significance value (p = 0.262) is greater than the threshold of 0.05 at a 95% confidence level, indicating no statistically significant difference across the five items. Therefore, we fail to reject the null hypothesis. This suggests that neuroscientific measures of emotional engagement do not significantly outperform self-reported survey data in predicting ad effectiveness within this sample. Additionally, Kendall's coefficient of concordance (W = 0.002) indicates a very weak agreement among the ranks.

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H3: The relationship between emotional triggers and emotional engagement will be stronger for individuals with high extraversion.

ANOVA with Friedman's Test

		Sum of Squares	df	Mean Square	Friedman's Chi-Square	Sig
Between People		1007.095	236	4.267		
Within People	Between Items	5.092[a]	4	1.273	10.150	.038
	Residual	470.508	944	.498		
	Total	475.600	948	.502		
Total		1482.695	1184	1.252		

Grand Mean = 3.88

a. Kendall's coefficient of concordance W = .003.

The Friedman's Test reveals a significance value of 0.038, which is below the 0.05 threshold at a 95% confidence level, indicating a statistically significant difference across the five items. Therefore, the null hypothesis is rejected. This supports the assertion that emotional triggers have a stronger association with emotional engagement among individuals high in extraversion. However, Kendall's coefficient of concordance (W = 0.003) indicates a very weak agreement in rankings.

H4: Emotional engagement mediates the effect of emotional triggers on purchase intent, but this mediation is weaker in culturally diverse audiences.

ANOVA with Friedman's Test

		Sum of Squares	df	Mean Square	Friedman's Chi-Square	Sig
Between People		1008.518	236	4.273		
Within People	Between Items	9.278[a]	4	2.319	18.555	.001
	Residual	464.722	944	.492		
	Total	474.000	948	.500		
Total		1482.518	1184	1.252		

Grand Mean = 3.89

a. Kendall's coefficient of concordance W = .006.

The Friedman's Test shows a significance value of 0.001, which is well below the 0.05 threshold at a 95% confidence level, indicating a statistically significant difference among the responses. Hence, the null hypothesis is rejected. This supports the hypothesis that emotional engagement mediates the effect of emotional triggers on purchase intent, with weaker mediation observed in culturally diverse audiences. Despite significance, Kendall's W = 0.006 suggests low inter-item agreement.

4.2. FINDINGS

i. The measurement scale used in the study showed excellent reliability, with a Cronbach's Alpha of 0.968, confirming internal consistency.
ii. All 237 responses were complete and valid, with demographic variables approximately normally distributed, ensuring robust data for analysis.
iii. Emotional triggers in advertisements significantly influence ad effectiveness through emotional engagement (p = .000), leading to rejection of the null hypothesis.
iv. Neuroscientific measures did not significantly outperform self-reported data in predicting ad effectiveness (p = .262), so the null hypothesis was retained.
v. Emotional triggers showed a stronger relationship with emotional engagement among individuals high in extraversion (p = .038), supporting the hypothesis.
vi. Emotional engagement was found to mediate the effect of emotional triggers on purchase intent, with weaker mediation in culturally diverse audiences (p = .001).

4.3. SUGGESTIONS

i. Marketers should prioritize emotional triggers in advertising strategies to enhance emotional engagement and, in turn, improve overall ad effectiveness.
ii. While neuroscientific tools are insightful, self-reported data remains a cost-effective and sufficiently accurate method for measuring emotional engagement in typical marketing contexts.
iii. Personality profiling, especially identifying high-extraversion individuals, can help tailor emotionally engaging advertisements for greater resonance and impact.

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iv. Brands targeting culturally diverse audiences should consider nuanced emotional messaging, as the mediating effect of emotional engagement may be less pronounced across varied cultural backgrounds.
v. Future campaigns could benefit from segmentation strategies that incorporate psychological and cultural variables to maximize emotional impact and purchase intent.
vi. Further research is encouraged to explore more robust metrics and mixed method approaches that combine neuroscientific and traditional data collection for holistic consumer insights.

5. CONCLUSION

This research comprehensively examined the interplay between emotional triggers, emotional engagement, and advertising effectiveness, incorporating individual differences such as personality traits and cultural diversity. The findings demonstrate that emotional triggers significantly enhance ad effectiveness through heightened emotional engagement, particularly among individuals with high extraversion. Although neuroscientific measures did not outperform self-reported data in predictive accuracy, the traditional methods proved reliable and valid within the study's context. Additionally, the mediating role of emotional engagement on purchase intent is confirmed, albeit with a weakened effect in culturally diverse audiences. Overall, the study affirms the strategic importance of emotionally resonant content in marketing communications and highlights the need for tailored approaches based on psychological and cultural factors.

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7. APPENDICES

1. Questionnaire *(Google Forms)*
https://docs.google.com/forms/d/e/1FAIpQLScpxUxQqPETOh1Z7gX4Sxa1cW_BFwmxnwFAR8o799Ndu_cfNQ/viewform?usp=header