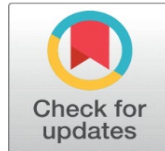


EXPLORING NEUROMARKETING TECHNIQUES: A QUANTITATIVE ANALYSIS OF EYE-TRACKING AND EMOTIONAL ADVERTISING ON FMCG SELF-CARE PRODUCT SELECTION IN BENGALURU

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Received 07 August 2025

Accepted 08 September 2025

Published 31 October 2025

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DOI

[10.29121/granthaalayah.v13.i10.2025.6397](https://doi.org/10.29121/granthaalayah.v13.i10.2025.6397)

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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ABSTRACT

In the competitive FMCG market of today, especially in metro cities such as Bengaluru, it has become vital to comprehend what really moves consumer buying behavior. Although price and quality continue to play a role, numerous purchases are indirectly driven by emotional drivers and rapid mental reactions. In addition to these affective factors, visual attention also takes a vital role in which consumers' gaze, duration of their focus, and what attracts their gaze can strongly influence their interest and final decision. Eye-tracking can facilitate the capture of these unconscious viewing habits, enabling one to associate attention with purchasing behavior. This research examines the impact of neuromarketing methods, namely emotional advertising, brand imagery, and eye-tracking, on buying behavior of consumers in purchasing self-care items like soaps, shampoos, and deodorants.

The aim of the research was to evaluate consumer knowledge of neuromarketing and determine the influence of emotional and non-rational components on brand choices and impulse purchases. The sample size was consumers in Bengaluru who regularly bought FMCG self-care items. The sampling unit was independent consumers, who were picked by a probability sampling technique with a simple random sampling method. There were 120 respondents involved in the study via a structured online survey questionnaire.

In conclusion, the research emphasizes the role of emotional involvement and implicit effects in guiding consumer choices in Bengaluru's FMCG self-care market. Brands that adopt neuromarketing strategies such as emotional narrative and eye-tracking responsibly and openly can find a competitive advantage and establish healthier consumer relations. Nonetheless, consumer awareness building and protection of privacy are vital for long-term trust development in such methods.

Keywords: Neuromarketing, Consumer Behavior, FMCG Self-Care Products, Emotional Advertising, Eye-Tracking

1. INTRODUCTION

Neuromarketing is a multidisciplinary area of study that combines neuroscience, psychology, and marketing to gain an insight into how customers unconsciously react to advertisements, brands, and products. In contrast to other conventional forms of research that rely greatly on self-reported views, neuromarketing employs sophisticated scientific techniques like eye-tracking, EEG (Electroencephalography), and fMRI (Functional Magnetic Resonance Imaging) to

deliver real-time information on brain activity, attention, and emotional arousal. These techniques extend beyond awareness and enable marketers to identify what grabs attention, what elicits emotion, and what finally influences purchases. In vibrant, growing cities such as Bengaluru, consumers are bombarded by numerous product offerings and compelling advertising, and decision-making tends to be driven more by the subtle signals of emotion than by logical consideration. This renders neuromarketing particularly pertinent to the FMCG self-care category, where items like soaps, shampoos, deodorants, lotions, and face washes are not just bought for their functional value but also for such intangible attributes as fragrance, appealing packaging, reputable branding, and the feeling of confidence or comfort that they evoke. By accessing these unconscious motivations, companies can engage more effectively with customers and establish meaningful differentiation in saturated markets.

Of the many neuromarketing techniques, emotional advertising and eye-tracking are especially noteworthy. Emotional advertising is designed to engage with consumers at a psychological level by engaging them at an affective or emotional level, eliciting feelings of happiness, nostalgia, security, or excitement. These affective states make ads more memorable, lead to greater brand recall, and encourage loyalty, frequently driving consumer choice even when other products have similar functional benefits. Eye-tracking augments this by identifying the way consumers visually engage with ads or product displays—where their attention is caught, how long they gaze at critical elements, and the order in which they take in information. By understanding this, marketers can fine-tune ad composition, product packaging, and in-store displays so critical messages and visuals get maximum attention. In combination, emotional advertising and eye-tracking are a powerful combination for crafting engaging, consumer-focused, and ethically sound marketing campaigns. By linking campaigns to subconscious likes, brands are able to drive not only purchase intent but also planned and impulse purchases in the self-care FMCG market, for the stronger consumer relationships and long-term brand success.

2. REVIEW OF LITERATURE

[Alam et al. \(2025\)](#): Gender selection in FMCG advertising: Eye-tracking insights. This empirical eye-tracking study assesses how gender of endorsers affects visual attention and implicit engagement for FMCG ads, with relevance for personal-care product creatives. The paper's objective is to measure differential attention patterns and link them to attitudinal measures. Limitations include potential cultural specificity, constrained stimulus types, and short-term measures that do not capture long-term purchase behavior. Statistical approaches include mixed ANOVAs on fixation durations across AOIs, repeated-measures comparisons, and correlational analyses connecting gaze metrics to self-reported intent. The findings support tailoring endorser selection to target demographics in beauty and self-care segments.

[Roy and Singh \(2024\)](#): A systematic review on EEG-based neuromarketing. This recent review collates EEG studies that investigate engagement, attention, and approach-avoidance metrics in marketing contexts, synthesizing signal metrics tied to purchase intention and ad effectiveness. The objective is to map recent EEG approaches and identify gaps and standardization issues. Limitations include publication bias toward positive findings and heterogeneity in EEG protocols (channels, preprocessing), which complicates meta-analytic aggregation. The

review employs systematic search protocols, study coding, and descriptive statistics (frequencies of measures), occasionally aggregating effect sizes when reported, but primarily reports narrative synthesis due to methodological diversity. Its recommendations for standardized EEG pipelines are directly applicable to FMCG sensory and advertising studies.

[Singh and Roy \(2024\)](#): Systematic review on EEG-based neuromarketing (Frontiers). This open-access synthesis catalogs EEG indicators used in neuromarketing and examines their links to attention, memory, and affective engagement, with a strong focus on methodology and reproducibility. The main objective is to create an accessible map of EEG measures and practical recommendations for implementation. Limitations include reliance on peer-reviewed publications (omitting industry reports), and variable reporting quality in primary studies, which limits meta-analytic precision. Methods involve systematic literature search, risk-of-bias assessment, and descriptive synthesis; some analyses include frequency distributions of EEG metrics and qualitative assessments of preprocessing pipelines. The paper's methodological guidance supports replicable EEG designs in the FMCG context.

[Miethlich and Miethlich \(2024\)](#): Visual design in dairy packaging affects consumer attention and choice. Though in dairy, this experimental study demonstrates how visual hierarchy, color, and typography affect attention and product selection—insights transferable to self-care packaging. The objective is to quantify design features' impact on eye-tracking metrics and choice. Limitations are industry specificity and controlled stimuli that may not fully generalize to varied retail displays; effect magnitudes may differ by category. Analytical tools include logistic regression for choice prediction, ANOVA for gaze metrics across treatments, and cluster analyses for segment-level differences. This paper provides methodological templates for shelf tests of shampoos, soaps, and lotions.

[Jain and Anand \(2024\)](#): Eye-tracking in neuromarketing: Visual attention patterns. The authors examine how cluttered shelf environments shape fixation patterns and how those patterns relate to choice in low-involvement FMCG categories. The main objective is to show that simple gaze metrics can predict selection probability. Limitations include sample homogeneity, artificial shelf displays, and limited cross-cultural testing. Statistical analyses use survival analyses for time-to-first-fixation, logistic regression linking fixation features to choice, and ANOVAs comparing attention across display types. The study supports the use of eye-tracking to optimize shelf placement and packaging prominence in personal-care product merchandising.

[Aldayel et al. \(2023\)](#): Electroencephalography in consumer behaviour and marketing. This bibliometric and thematic mapping identifies key constructs measured with EEG—trust, reward anticipation, willingness-to-buy—and highlights evolving analytic approaches (ERP, spectral power, connectivity). The paper aims to orient researchers to contemporary EEG markers and their relevance for applied marketing research. Limitations include confinement to studies indexed in select databases and methodological heterogeneity across studies. Analytical methods include bibliometric counts, co-citation mapping, and thematic clustering; where effect sizes are available, the authors summarize them descriptively. The article is valuable for choosing appropriate EEG metrics when designing experiments about FMCG self-care ads, packaging, and in-store attention.

[Bălăceanu and Tănase \(2023\)](#): Using eye-tracking technology in neuromarketing. This paper reviews eye-tracking metrics (fixations, saccades, dwell time) and their interpretation for studying visual attention in marketing contexts,

especially packaging and point-of-sale. The study's objective is to link gaze patterns to underlying cognitive processes and to provide practical recommendations for marketers. Limitations include an emphasis on lab-based studies with controlled displays, which may not capture ecological in-store behavior, and variable sample sizes across cited experiments. Analytical tools discussed include AOI (areas of interest) statistics, heatmaps, sequence analyses, and correlational tests linking gaze to choice, often employing t-tests, ANOVA, and regression models to relate visual attention metrics to behavioral outcomes.

[Safitri and Mutiara \(2020\)](#): Neuromarketing: A historical review. This short review summarizes the evolution and definitional debates within neuromarketing, seeking to clarify conceptual boundaries and to critique methodological exuberance. The main objective is to synthesize milestones and recommend best practices for future research, especially in commercial applications. Limitations include its narrative scope and secondary reliance on available reviews rather than new empirical data; generalizability is therefore limited. Analytical approach focuses on thematic synthesis rather than inferential statistics—counting publications, summarizing methods (EEG, fMRI, eye-tracking), and highlighting reproducibility concerns. The work provides a compact framing useful for justifying mixed-methods approaches in applied FMCG research and for explaining why rigorous methods are necessary for credible results.

[Levallois et al. \(2019\)](#): The emergence of neuromarketing (2002–2008). This historical preprint traces the formation of the neuromarketing field using public communications and early academic signals, aiming to document how the term entered scholarly and public discourse. The objective is descriptive and historiographic: to show trajectories in terminology, commercialization, and academia–industry interaction. Limitations include reliance on public communications (which may not capture private R&D), potential selection bias in sources, and a focus on an early time window that excludes later methodological maturation. The authors primarily use qualitative content analysis and bibliometric trend description; where quantitative, they apply simple frequency counts and timeline visualizations. The paper is useful for situating contemporary neuromarketing debates in their socio-historical emergence.

[Maison et al. \(2016\)](#): Implicit consumer ethnocentrism and product preference. This empirical paper explores how implicit in-group preferences (home-country bias) influence product evaluation, with implications for local vs global self-care brands in India. The objective is to assess predictive power of implicit ethnocentrism for preference. Limitations are sample representativeness and context-specificity; implicit attitudes may interact with product quality perceptions. Analytical tools include IAT scoring algorithms, ANOVAs comparing groups, and regression models linking implicit scores to explicit choices. Findings suggest implicit ethnocentrism can explain variance in preference not captured by declared attitudes, relevant for positioning of local personal-care brands.

[Venkatraman et al. \(2015\)](#): Predicting advertising success beyond traditional measures. This paper integrates neurophysiological measures (EEG/fMRI biomarkers) with conventional metrics to predict advertising effectiveness at market scale, arguing neurodata can explain variance beyond self-reports. The objective is to evaluate predictive validity of brain measures for marketplace outcomes such as sales and ad recall. Limitations include heterogeneity in ad types, potential overfitting in predictive models, and challenges in translating lab biomarkers to diverse market contexts. The authors apply multivariate regression, cross-validation, and machine-learning classifiers to combine neural features with

behavioral and attitudinal predictors, emphasizing out-of-sample prediction performance. The methodological rigor and forecasting emphasis make this study a cornerstone for neuromarketing's claim to forecast real-world outcomes.

Plassmann et al. (2008): Marketing actions can modulate neural representations of experienced pleasantness. This experimental fMRI study investigates how price cues influence consumers' neural and subjective experiences of taste, demonstrating that higher price labels increase reported pleasantness and activate value-related brain regions. The main objective is to test whether marketing signals (price) alter sensory valuation represented in the brain, linking managerial actions to consumer experience. Limitations include a small laboratory sample, product-specific context (wine tasting), and limited generalizability to low-involvement FMCG purchase contexts. Statistical tools include general linear models for fMRI data, region-of-interest analyses focused on value-related structures (e.g., orbitofrontal cortex), and behavioral ANOVAs comparing rating differences across price conditions. The study is often cited for demonstrating context-dependent valuation and justifying neuromarketing measures in stimulus evaluation.

Hubert and Kenning (2008): A current overview of consumer neuroscience. This review maps methods (fMRI, EEG, psychophysiology) and core constructs (attention, reward, emotion) used in consumer neuroscience and argues for theoretical integration between psychology and marketing. The main objective is to provide managers and researchers a conceptual taxonomy of techniques and applications—packaging, brand choice, advertising—while pointing out methodological trade-offs (temporal vs. spatial resolution). Limitations discussed include ethical concerns, costly equipment, and interpretive challenges in applying neuroscientific data to complex consumer contexts. The review surveys typical statistical procedures across studies—GLM for fMRI, spectral and ERP analyses for EEG, and correlational/mediation models—urging multi-method convergence to strengthen inference and practical applicability in sectors such as FMCG self-care.

Yoon et al. (2006): Neural dissociations between brand and person judgments. Using fMRI, the study contrasts neural responses when participants make judgments about brands versus people, finding dissociable neural circuits implicated in brand attitudes. The main objective is to demonstrate that brand evaluations rely on different cognitive-affective processes than interpersonal judgments, with implications for brand equity and identity building. Limitations include domain specificity, small sample typical of fMRI studies, and limited behavioral outcome measures; findings may not fully generalize to fast-moving consumer goods or low-involvement choices. Statistical techniques include GLM-based voxelwise contrasts, region-of-interest analyses, and conjunction analyses to map activation patterns. This research supports conceptualizing brands as complex socio-cognitive constructs with unique neural signatures relevant for personal-care brand positioning.

Maison et al. (2004): Predictive validity of the Implicit Association Test (IAT) for brands. This working-paper style investigation assesses whether implicit attitude measures predict brand choices beyond explicit self-reports, seeking to validate IAT in consumer contexts. The central objective is to test predictive validity for brand preference and purchase intention. Limitations include context sensitivity of IAT, concerns about construct interpretation, and difficulties in linking implicit scores to complex buying situations. Statistical methods include regression models comparing IAT and self-report predictors, hierarchical regressions to assess incremental validity, and correlations. The study is influential in arguing that

implicit measures can capture latent biases relevant to brand switching and loyalty in FMCG.

2.1. RESEARCH GAP

The key lacuna in the current literature is the paucity of application of neuromarketing techniques like eye-tracking and emotional advertisement to examine consumer preference in India's FMCG self-care space, especially in urban markets like Bengaluru.

2.2. STATEMENT PROBLEM

Consumer purchases in the FMCG industry are typically based on unconscious emotional stimuli instead of solely rational consideration. Conventional marketing techniques do not address these unaware reactions, preventing prediction of actual consumer behavior. In Bengaluru's competitive FMCG environment, the utilization of neuromarketing tactics such as emotional advertising and eye tracking is underdeveloped, leaving a void for the understanding of these elements actually driving consumer buying behavior.

2.3. RESEARCH OBJECTIVES:

- 1) To understand how Bengaluru consumers react emotionally to ads and products.
- 2) To study how neuromarketing tools (eye-tracking) affect consumers' buying decisions.

2.4. HYPOTHESIS:

Objective 1:

- **H1 (Alternative Hypothesis):** Emotional responses significantly influence consumer preference for FMCG ads and products in Bengaluru.
- **H0 (Null Hypothesis):** Emotional responses do not significantly influence consumer preference for FMCG ads and products.

Objective 2:

- **H1 (Alternative Hypothesis):** There is a significant relationship between eye-tracking metrics and consumer purchase decision in the FMCG sector.
- **H0 (Null Hypothesis):** There is no significant relationship between eye-tracking metrics and consumers purchase decision in the FMCG sector.

3. RESEARCH DESIGN

3.1. RESEARCH DESIGN TYPE

Descriptive and analytical research design has been followed by Researcher and described the research work in descriptive form with hypothesis statistical testing.

3.2. SAMPLING METHOD AND SIZE

Purposive and convenience sampling method has been followed by researcher to gather the responses from target respondents. Researcher has taken 120 consumers of FMCG self-care products from Bengaluru as sample size from a population of 500.

3.3. SOURCE OF DATA

The data has been gathered from primary sources. Primary data was collected from consumers by sending questionnaires.

3.4. INSTRUMENTS FOR DATA COLLECTION

The researcher has gathered information by using a structured questionnaire (Google Forms) and neuromarketing tools like eye-tracking simulations and emotional response scales.

Tools for Data Analysis

Data analysis tools, Chi-square test, conducted using Jamovi.

3.5. LIMITATIONS OF THE STUDY:

- The research is constrained by having a relatively small sample size, so the findings might not be representative of the larger population in Bangalore.
- As the research is only done in Bengaluru, the findings might not be applicable to the consumer behaviour of other places with various contexts.
- The research primarily gets short-term consumer reactions and might not adequately represent long-term patterns of behaviour.

4. DATA ANALYSIS AND INTERPRETATION

Table 1

Gender	Number of Respondents	Percentage
Male	75	62.50%
Female	45	37.50%
Prefer not to disclose	0	0.00%
Total	120	100%
Age Group	Number of Respondents	Percentage
18–22	51	42.50%
23–27	60	50.00%
28–32	3	2.50%
33–37	3	2.50%
38 and above	3	2.50%
Total	120	100%
Occupation	Number of Respondents	Percentage
Student	87	72.50%
Working Professional	26	21.67%
Entrepreneur	6	5%
Homemaker	1	0.83%

Total	120	100%
Education Level	Number of Respondents	Percentage
Undergraduate	33	27.50%
Postgraduate	83	69.17%
Doctorate	1	0.83%
Other	3	2.50%
Total	120	100%

Interpretation:

The questionnaire had 120 participants, where the majority were male (62.5%) and 37.5% female, and none wanted to withhold their gender. When it came to age, the greater part of the participants were young adults, where 42.5% were in the category of 18–22 years and 50% were in the category of 23–27 years, while just a fraction (7.5%) were 28 years and older. In terms of profession, students constituted the majority at 72.5%, followed by professionals at work at 21.67%, entrepreneurs at 5%, and homemakers at 0.83%. In terms of educational qualifications, the majority was postgraduates (69.17%), followed by undergraduates (27.5%), while some had doctorate degrees (0.83%) or other educational backgrounds (2.5%). Generally, the information shows that the survey only picked up answers from youth, educated people, mainly students, and had a slight dominance of males.

Objective 1:

To understand how Bengaluru consumers react emotionally to ads and products.

Table 2

Contingency Tables						
Levels of Purchase Preference Ratings						
Levels of Eye-tracking Metrics	1	2	3	4	5	Total
1	1	0	14	21	12	48
2	3	3	19	12	2	39
3	0	2	10	18	3	33
Total	4	5	43	51	17	120

χ^2 Tests			
	Value	df	p
χ^2	18.9	8	0.015
N	120		

Hypothesis:

- **H1 (Alternative Hypothesis):** A significant relationship exists between eye-tracking fixation levels and consumer purchase preferences in the FMCG sector.
- **H0 (Null Hypothesis):** There is no significant relationship between eye-tracking fixation levels and consumer purchase preferences in the FMCG sector.

Interpretation:

The chi-square test ($\chi^2 = 18.9$, $df = 8$, $p = 0.015$) reveals a statistically significant link between consumer eye-tracking measures and their purchase intentions, which means that gaze measures recorded through eye-tracking are not random but meaningfully connected to buying intention in the context of FMCG advertising. The null hypothesis rejection verifies that differences in visual engagement levels are systematically related to choice behavior among consumers. In particular, subjects with high or low visual attention showed more positive purchase inclinations, while those with moderate attention tended to be indifferent. Such a profile would indicate a two-way mechanism whereby advertising affects consumers: a momentary, intense flash of visual attention that leads to immediate interest, or a long-term, deep focus that leads to reflective involvement and ultimately preference development. Conversely, a mid-level attention seems not enough to drive consumers to a purchasing decision, highlighting the need for marketers to craft creatives that either grab immediate high attention or hold viewers long enough to maximize brand persuasion. With a sample of 120 respondents in total, these results give strong evidence that eye-tracking measures are good indicators of purchase intention and support the importance of incorporating neurophysiological knowledge into FMCG advertising strategy.

Objective 2:

To study how neuromarketing tools (eye-tracking) affect consumers' buying decisions.

Chi-Square Test:**Table 3**

Contingency Tables						
Consumer Purchase Preferences						
Eye-Tracking Metrics	1	2	3	4	5	Total
1	1	1	17	29	13	61
2	1	0	2	7	4	14
3	0	1	12	9	0	22
4	0	2	4	4	0	10
5	2	1	8	2	0	13
Total	4	5	43	51	17	120

χ^2 Tests			
	Value	df	p
χ^2	36.7	16	0.002
N	120		

Hypotheses:

- H1 (Alternative Hypothesis): There is a significant relationship between eye-tracking metrics and consumer purchase decision in the FMCG sector.
- H0 (Null Hypothesis): There is no significant relationship between eye-tracking metrics and consumer purchase decision in the FMCG sector.

Interpretation:

Chi-square analysis showed that eye-tracking measures were significantly associated with consumers' choice of purchase ($\chi^2 = 36.7$, $df = 16$, $p = 0.002$), which offers strong statistical support that visual engagement patterns with FMCG adverts are systematically linked with real buying decisions. The null hypothesis rejection and alternative hypothesis acceptance establish that the observed distribution of purchase choices across varying levels of visual focus is not random. That is, how consumers visually process FMCG advertisements—either through rapid, intense fixation or prolonged, intentional viewing—is directly and quantifiably associated with their probability of making a purchase decision. The counts of frequency in the contingency table, categorizing respondents based on the level of attention and purchase decision, further reflect this connection by illustrating that the differences in the eye-tracking attention are mirrored in marked differences in consumer choices. These findings emphasize that visual attention is not a coincidental element of ad exposure but a significant influence on purchasing decisions. Of value to both researchers and practitioners, the results highlight the strategic importance of incorporating eye-tracking wisdom into ad design, so creative materials are positioned to engage and maintain the kind of visual attention that translates into more powerful buying results in the competitive FMCG environment.

5. FINDINGS, SUGGESTIONS AND CONCLUSIONS

5.1. FINDINGS

- Emotional advertising plays a major role in consumer buying decisions.
- Positive emotions such as trust, happiness, and nostalgia boost product recall.
- Eye-tracking indicates fixation duration and gaze path have a strong influence on preferences.
- More visually attended products get higher purchase intention.
- Emotional triggers and visual cues together influence buying behavior.
- Attractive visuals grab attention, but emotions maintain interest.
- Neuromarketing instruments (emotions + eye-tracking) play a strong role in FMCG consumer choice.

5.2. SUGGESTIONS

- Businesses should design ads that trigger positive emotions like trust, joy, and hope.
- FMCG companies must use eye-tracking insights to place key product features where consumers focus most.
- Packaging should be visually appealing and easy to notice on crowded shelves.
- Ads must combine emotional storytelling with strong visuals for maximum impact.
- Brands should regularly test prototypes using neuromarketing tools before mass campaigns.
- Businesses must balance emotional value with product quality to build long-term trust.

- Advertisers must tie their campaigns to social values (e.g., sustainability, health) in order to resonate strongly with consumers.

5.3. CONCLUSION

The study emphasizes that consumers' visual attention to FMCG ads plays a significant role in influencing their buying decisions. The results indicate that when advertisements either grab intense immediate attention or maintain a viewer's attention over a continued period, they will have stronger effects on purchasing decisions. Conversely, moderate attention tends to generate neutral decisions, and grabbing a quick look is not enough to produce action. These findings highlight the need for developing advertisements that will either produce an immediate visual effect or induce a higher level of engagement, making sure that brand communications are strong enough to translate interest into a purchase decision.

Practically speaking, the findings underscore the necessity for marketers to regard visual design not as a design aspect but as a strategic tool. Brand managers and creative teams will be able to create advertisements and packaging that resonate better with their target audience by understanding how visual cues shape consumer decision-making. By targeting areas that evoke either instant attention or long-term engagement, FMCG brands in the crowded marketplace can reinforce their power to influence consumer decisions and enhance the performance of their marketing campaigns overall.

CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

None.

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