Journal of Applied Cosmetology

ISSN 2974-6140 (online) ISSN 0392-8543 (print)

Investigative Study

Exploring the Impact of Neuromarketing on Consumer Behavior in the Cosmetics Industry

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Keywords: *consumer behaviour, structural equation model, marketing, cosmetic*

Received: 14 October 2025
Accepted: 09 February 2026

ISSN 2974-6140 (online) ISSN 0392-8543 (print).

DISCLOSURE: ALL AUTHORS REPORT NO CONFLICTS OF INTEREST RELEVANT TO THIS ARTICLE.

ABSTRACT

This study examines the impact of neuromarketing strategies on consumer behaviour in the cosmetic industry, focusing on age- and gender-based differences in responses to marketing stimuli. Employing a mixed-methods approach, the research combines quantitative analysis through Structural Equation Modelling (SEM) with qualitative insights from survey data. The findings reveal that neuromarketing significantly influences consumer behaviour by eliciting cognitive and emotional responses. Younger consumers, especially Millennials and Gen Z, respond positively to sustainability, inclusivity, and emotional messaging, while older consumers prioritize product efficacy and long-term benefits. Gender differences are evident, with women favoring emotional narratives and men being more influenced by practical and functional appeals. This research highlights the growing importance of neuromarketing in designing effective and ethical marketing strategies, offering valuable insights for both academic and industry applications in the rapidly evolving beauty market.

INTRODUCTION

Consumer behaviour is a major topic in business and other fields, often discussed and studied in depth to better align products with consumer needs and sell them effectively. According to Kardes et al., the study of consumer behaviour began around the 1940s when companies shifted their approach from merely selling products to designing products that people actually wanted (1). This shift marked the beginning of modern marketing. About 30 years later, Nelson emphasized that the decision to buy something is a highly personal and unique process (2). Nelson was the first to explore how information about a product’s quality and price influences purchasing decisions. Since then, the study of consumer behaviour has evolved significantly, now grounded in scientific research on how consumers make purchasing choices. While Nelson's study focused primarily on basic product details such as quality and price, today’s research spans many areas, including psychological factors and business strategies (2).

In the rapidly evolving consumer market, where every brand seeks customers' attention and loyalty, understanding what drives consumer behaviour has never been more crucial. Neuromarketing, an emerging field at the intersection of neuroscience and marketing, offers valuable insights into the drivers of consumer decision-making (3). The focus is on studying the cognitive and emotional responses of consumers to different marketing stimuli (4, 5). By examining the brain's response to these stimuli, neuromarketing enables brands to craft strategies that resonate more deeply with potential clients (3).

Unlike traditional marketing methods, neuromarketing is more appealing to both scientists and companies. According to the literature, these methods are advantageous because they provide more information in a shorter amount of time. Consumer insights obtained through neuromarketing techniques are often unattainable through conventional marketing methods (6). With the help of neuroscience, individual behaviour and decision-making can be studied more precisely, generating data that are more rigorous, accurate, and scientifically validated for further analysis (7, 8). It is important to highlight the key difference between traditional marketing and neuromarketing: the former focuses primarily on what works, while the latter seeks to understand why something works and how it is achieved. This is where the fields of marketing, neuroscience, and psychology converge (9).

The cosmetic industry is one of the most influential business sectors globally. The global market for cosmetic products was estimated at $380.2 billion in 2019 and is projected to reach $463.5 billion by 2027,

with an annual growth rate of 5.3% between 2021 and 2027 (10). Davis shows that Millennials and Gen Z consumers use approximately 16% more cosmetic products than the average consumer, a trend that is expected to continue (11). It is important to note that well-thought-out marketing and branding significantly influence the purchasing decisions of all consumer groups (11).

Accordingly, this study investigates the impact of neuromarketing strategies on consumer behaviour in the selection and purchase of cosmetic products, analysing variations in responses by age and gender.

LITERATURE REVIEW

The cosmetic industry has evolved into a complex, value-driven market in which consumer behavior is shaped by both functional and psychological determinants. While product effectiveness, safety, and quality remain fundamental, emotional factors such as self-esteem, confidence, and self-care increasingly influence purchasing decisions (11). Cosmetics, therefore, function not only as utilitarian products but also as symbolic goods that contribute to personal identity and emotional well-being. This dual nature makes the industry particularly suitable for analyses that integrate consumer behavior theories with insights from neuromarketing.

Recent literature highlights a growing shift among consumers toward sustainability, ethical production, and clean beauty. The expansion of natural cosmetic products is closely linked to increased self-awareness and environmental concern, supported by the broader “eco” lifestyle trend (12). Research by Shim et al. shows that Millennials and Gen Z demonstrate selective purchasing behaviors regarding clean beauty, favoring certification labels and transparent information (13). Their findings indicate that environmental and ethical standards are prioritized over purely organic claims, suggesting that consumers are becoming more informed about ingredient safety and production practices. Similar conclusions are reported by Chandra et al., who find that sustainability-related perceptions positively influence purchasing behavior, particularly among younger consumers (14).

However, sustainability alone does not fully explain consumer choices in the cosmetic market. Amberg and Fogarassy identify distinct consumer segments, including those who exclusively purchase natural cosmetics, those who prefer conventional products, and those who alternate between both (15). Their findings reveal that while health and environmental concerns motivate some consumers, effectiveness, trust in established brands, and access to reliable information remain decisive factors. Importantly, environmental awareness does not automatically translate into sustainable purchasing behavior, reinforcing the need to analyze ethical perceptions alongside functional product evaluations.

Brand-related factors continue to play a significant role in shaping consumer decisions. Brand image, popularity, and price perception have been shown to exert a positive and significant influence on purchasing behavior among Millennials and Gen Z (14). Davis further emphasizes that younger consumers gravitate toward brands that reflect their personal values, including inclusivity, sustainability, and social responsibility (11). These findings suggest that brand perception operates not only as a signal of quality but also as a psychological cue that fosters emotional attachment and trust.

Marketing strategies amplify these psychological mechanisms by targeting economic, emotional, and socio-cultural dimensions of consumer behavior. Shi demonstrates that discounts primarily appeal to economic considerations, promotions activate psychological engagement, and co-branding strategies leverage social identity (16). These overlapping effects indicate that marketing stimuli influence consumers through multiple cognitive pathways. In digital contexts, social media marketing has become particularly influential. Chuah et al. shows that entertainment, trendiness, and electronic word-of-mouth significantly enhance online

purchase intentions in the cosmetic industry, with entertainment emerging as the strongest driver (17). Peer reviews and social validation further reinforce consumer confidence, highlighting the importance of emotionally engaging and socially endorsed content.

Traditional research methods, such as surveys and interviews, provide valuable insights into conscious consumer preferences but often fail to capture the subconscious processes underlying decision-making (18). Neuromarketing addresses this limitation by examining how sensory and emotional stimuli affect attention, memory, and emotional engagement. Meyerding and Mehlhose argue that neuromarketing offers richer and more time-efficient insights compared to conventional methods (6). In the cosmetic industry, sensory cues such as color, texture, scent, and packaging are particularly influential. Odekerken explains that sensory stimuli can evoke emotional associations that increase purchase likelihood, while packaging design has been shown to significantly alter perceptions of quality and luxury, even through minor design changes (8, 9, 19).

Neuromarketing research further indicates that demographic characteristics shape consumer responses to marketing stimuli. Kenning and Lincmajer find that men and women exhibit different neural responses to advertising, with women responding more strongly to emotionally framed messages related to self-care and confidence, and men showing greater sensitivity to functional and product-focused information (20). Age also influences consumer responses, as younger consumers, particularly Millennials and Gen Z, react more strongly to messages emphasizing sustainability, ethical values, and brand authenticity (11). Older consumers, by contrast, tend to prioritize product effectiveness and long-term benefits such as anti-aging performance. These differences underscore the importance of considering demographic variables when analyzing cosmetic consumer behavior.

Despite its advantages, the application of neuromarketing raises ethical concerns related to privacy, transparency, and potential manipulation of unconscious consumer processes. Ariely and Berns caution that while neuromarketing provides valuable insights, it must be applied responsibly to avoid exploiting consumers (7). Ethical guidelines, including informed consent and responsible data use, are essential to maintaining trust (8). In the cosmetic industry, where brand credibility and authenticity are critical, ethical neuromarketing practices can strengthen consumer relationships rather than undermine them.

Overall, existing literature demonstrates that cosmetic purchasing behavior is influenced by a complex interaction of functional product attributes, emotional responses, brand perceptions, sustainability awareness, and marketing stimuli. Neuromarketing contributes valuable insights into the subconscious mechanisms underlying these factors, complementing traditional consumer behavior approaches. Building on these findings, the present study incorporates these established determinants into its survey instrument to examine how psychological, ethical, and demographic factors jointly shape consumer behavior in the cosmetic industry.

METHODOLOGY AND DATA ANALYSIS

This study used a mixed-methods design to examine the impact of neuromarketing strategies on consumer behavior in the cosmetics industry. The primary emphasis was quantitative, relying on survey data analyzed through Structural Equation Modeling (SEM), while qualitative insights from open-ended survey questions were used to enrich and contextualize the quantitative findings. This approach enabled the study to capture both measurable relationships among constructs and consumers' subjective perceptions of neuromarketing stimuli.

Survey Design and Instrument Development

Data were collected using a structured, self-administered online questionnaire. The survey instrument was developed based on established constructs in consumer behavior and neuromarketing literature to ensure theoretical grounding and content validity. Measurement items were adapted from prior studies focusing on marketing exposure, emotional and cognitive responses, and purchasing behavior, and were tailored to the cosmetic industry context.

The questionnaire consisted of five sections: demographic information, exposure to neuromarketing strategies, cognitive and emotional responses, purchase behavior, and open-ended questions. The complete questionnaire used for data collection is provided in Annex 1. All quantitative items were measured using a five-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). The open-ended questions allowed respondents to elaborate on how marketing messages, packaging, and branding influenced their perceptions and decisions.

Prior to data collection, the questionnaire was reviewed for clarity and relevance. Minor wording adjustments were made to improve readability and reduce ambiguity.

Sampling and Data Collection

The target population consisted of consumers who regularly use cosmetic products. A non-probability convenience sampling method was employed, as the survey was distributed online via social media platforms and email networks. This method was considered appropriate given the exploratory nature of the study and its focus on perceptual and psychological variables.

Respondents were segmented into five age groups: 18–25 years, 26–30 years, 31–40 years, 41–50 years, and 50 years and above. This segmentation allowed for the examination of age-related differences in responses to neuromarketing strategies. A total of 100 valid responses were collected, meeting minimum sample size requirements for exploratory SEM analysis. The survey required approximately 5–10 minutes to complete, balancing respondent engagement with data depth.

Measurement of Variables

The general structure of SEM can be represented as a system of equations, consisting of measurement equations for observed variables and structural equations for latent variables (21).

$$\boldsymbol{\eta = \beta_{ij}\eta + \beta\ldots.+\zeta 1}$$

Where:

$\boldsymbol{\eta}$: represent latent variables;
$\boldsymbol{\beta_{ij}}$: represents the path coefficient, indicating the strength and direction of the relationship between latent variables η_i and η_j
ζ1: represents the residual or error term, capturing the unexplained variance or random error in the relationship between latent variables.

Three latent variables were specified in the SEM framework:

- **Exposure to Neuromarketing Strategies (ENS)**, measured through indicators related to social media advertising, influencer endorsements, and product packaging.

- **Cognitive and Emotional Responses (CER)**, measured using indicators capturing positive emotions, trust, and perceived product quality.
- **Purchase Behaviour (PB)**, measured through indicators related to purchase intention, frequency of purchase, and brand loyalty.

The SEM framework followed the general formulation proposed by Schumacker and Lomax, incorporating both measurement equations for observed indicators and structural equations for latent variables (21).

Data Preparation and Descriptive Statistics

Survey responses were cleaned and coded prior to analysis. Missing values were minimal and were addressed using mean imputation where appropriate. Categorical variables such as age group and gender were coded numerically for inclusion in the SEM model.

Descriptive statistics were generated to summarize sample characteristics and variable distributions. The sample consisted of 65% female and 35% male respondents. Age group distribution was as follows: 18–25 years (22%), 26–30 years (28%), 31–40 years (26%), 41–50 years (14%), and above 50 years (10%). Table I presents the descriptive statistics for all key variables.

Structural Equation Modeling Estimation

Before conducting the SEM analysis, the data collected from the survey was cleaned and coded. Missing values were addressed using mean imputation where applicable and categorical variables (such as age groups and gender) were coded for inclusion in the analysis. Then descriptive statistics were generated for key variables to provide an overview of the sample characteristics. Table I summarizes the descriptive analysis.

Table I. *Descriptive Statistics Source: Author's calculation in STATA.*

	Variable	Obs	Mean	Std. Dev.	Min	Max
	Gender	100	1.35	0.4793725	1	2
	Age	100	2.62	1.25352	1	5
Latent Variable 1	**ENS**	100	1.66	0.7415517	6	3
	SMA	100	1.9	0.8932971	6	5
	IE	100	2.06	1.023166	6	5
	PP	100	2.08	1.186456	6	5
Latent Variable 2	**CER**	100	1.11	1.072098	6	5
	PE	100	1.89	0.8977525	6	5
	T	100	1.67	0.8652086	6	4
	PPQ	100	1.91	0.8887058	6	5
Latent Variable 3	**PB**	100	1.95	1.048086	6	5
	PI	100	1.94	1.071391	6	5
	FP	100	2.86	0.9322505	6	4
	BL	100	1.91	1.137914	6	5

Gender distribution: 65% of respondents were females (F) and 35% were males (M).
Age Group: 18-25 years (22 participants – 12F and 10M) (1),
26-30 years (28 participants – 15 F and 13M) (2),
31-40 years (26 participants - 19F and 7M) (3),
41-50 years (14 participants – 10F and 4M) (4),

< 50 years (10 participants – 9F and 1M) (5).

SEM analysis was conducted using STATA. The estimation process involved three steps: model estimation, evaluation of model fit indices, and path analysis. Both the measurement model and structural model were assessed to confirm construct validity and test hypothesized relationships.

SEM estimation model is shown in the figure below.

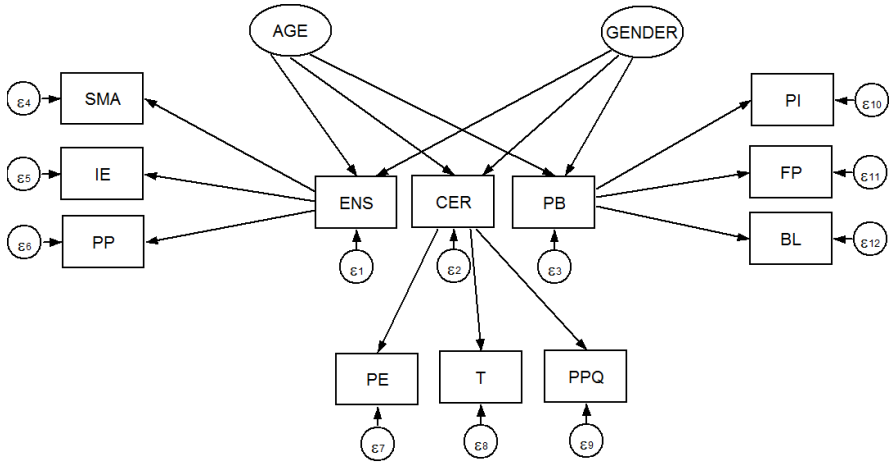

Figure 1. *SEM Model Results. (Source: authors' calculation in STATA).*

The model demonstrated strong explanatory power, accounting for 79% of the variance in the dependent variable (R^2 = 0.79), with an adjusted R^2 of 0.71 (Table II). Path coefficients indicated that exposure to neuromarketing strategies significantly influenced cognitive and emotional responses, which in turn significantly affected purchase behavior. Demographic variables such as age and gender also showed statistically significant effects, confirming the relevance of consumer heterogeneity in neuromarketing responsiveness.

Table II. *Regression Analysis.* (*Source: author's calculation in STATA).*

Regression Statistics						
Multiple R	84%					
R Square	79%					
Adjusted R Square	71%					
Standard Error	0.003679					
Observations	100					
	Coef.	Std. Err.	Z	p>|z|	[95% Conf.	Interval]
Age	0.7828655	0.1111657	5.22	0.000	0.3255567	1.9746456
Gender	0.9854788	0.1897666	4.91	0.000	0.4237774	1.0987655
ENS	0.8966439	0.1098887	3.07	0.000	0.2099878	0.9074515
CER	0.8666331	0.1895544	3.76	0.000	0.1257789	0.8738097
PB	0.7034679	0.18966456	3.21	0.000	0.4988900	1.4356778
LR test of model vs. saturated: chi2 (100) = 0.006, Prob > chi2 = 1.667						

DISCUSSION

The findings of this study confirm that neuromarketing strategies play a significant role in shaping consumer behavior in the cosmetic industry by influencing cognitive and emotional responses that ultimately drive purchasing decisions. Exposure to neuromarketing strategies, particularly through social media advertising, influencer endorsements, and product packaging, showed a strong positive effect on consumers' emotional engagement and trust. These results align with prior research suggesting that emotionally charged and sensory-rich marketing stimuli activate subconscious processes that enhance brand appeal (9, 17).

Cognitive and emotional responses emerged as a key mediating mechanism between marketing exposure and purchase behavior. This finding supports Davis, who argues that cosmetic consumption is driven not only by functional benefits but also by emotional needs such as confidence, self-expression, and well-being (11). The strong relationship between emotional engagement and purchase behavior highlights the relevance of neuromarketing approaches in explaining why consumers often favor brands that resonate with their identity and values.

Age differences observed in the model indicate that younger consumers are more responsive to emotionally driven marketing strategies, particularly those emphasizing sustainability, inclusivity, and visual storytelling. This is consistent with findings by Shim et al. and Chandra et al., who report that Millennials and Gen Z demonstrate stronger alignment with ethical and value-based brand messaging (13, 14). Older consumers, in contrast, were more influenced by functional considerations such as product effectiveness and brand reliability, reinforcing the idea that marketing strategies should be tailored to distinct demographic segments.

Gender also significantly influenced consumer responses, supporting earlier neuromarketing evidence that men and women process marketing stimuli differently (20). Women appeared more sensitive to emotional narratives and brand trust, while men responded more strongly to practical and performance-oriented cues. These findings underscore the importance of gender-sensitive marketing communication in the cosmetics industry.

From a theoretical perspective, this study contributes to the growing body of literature integrating neuromarketing with consumer behavior models by empirically demonstrating the mediating role of cognitive and emotional responses. Methodologically, SEM enabled the simultaneous examination of complex relationships among latent constructs, offering a more nuanced understanding of both direct and indirect effects.

From a managerial standpoint, the results suggest that cosmetic brands should prioritize emotionally engaging marketing strategies that align with consumer values, particularly when targeting younger demographics. Visual storytelling, ethical messaging, and sensory packaging design can enhance emotional connection and brand loyalty. At the same time, brands targeting older consumers should emphasize product performance, quality assurance, and long-term benefits.

Despite its contributions, this study has limitations. The use of convenience sampling and a relatively small sample size limits generalizability. Future research could employ larger, more diverse samples, integrate experimental neuromarketing tools such as eye tracking or EEG, and further explore cross-cultural differences in neuromarketing responsiveness.

Overall, the findings demonstrate that neuromarketing strategies are a powerful tool for understanding and influencing consumer behavior in the cosmetic industry when applied ethically and strategically.

CONCLUSIONS

This study examines the impact of neuromarketing strategies on consumer behavior in the cosmetic industry, highlighting variations across age and gender. Using Structural Equation Modelling (SEM) and survey data, the findings confirm that neuromarketing influences decision-making by triggering cognitive and emotional responses. Younger consumers (Millennials and Gen Z) respond strongly to emotional, sustainable, and inclusive messaging, while older consumers prioritize product efficacy. Gender differences are evident, with women engaging more with emotional narratives and men favoring functional marketing.

Key neuromarketing techniques, such as visual storytelling, influencer endorsements, and eco-friendly messaging, significantly shape consumer perceptions and drive purchase intentions. Social media and packaging design emerged as critical factors in engagement and brand loyalty. The study also emphasizes that ethical marketing practices are essential for maintaining consumer trust.

By integrating insights from psychology, neuroscience, and marketing, this research provides a robust framework for understanding consumer responses in the beauty industry. The findings offer valuable implications for brands seeking to design more effective, targeted marketing strategies to enhance engagement and long-term loyalty.

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