AI-enabled Neuromarketing and Consumer Decision-Making in Food and Beverage Marketing: The Mediating Role of Emotional Engagement and Brand Perception

A Selva Soundari [1], Dr. M Mohammed Sikkandher [2]

[1] Research Scholar, School of Commerce, Vel Tech Rangarajan Dr. Sagunthala, R& D Institute of Science & Technology

[2] Assistant Professor,School of Commerce,Vel Tech Rangarajan Dr.Sagunthala,R& D Institute of Science & Technology

KEYWORDS

Artificial Intelligence; Neuromarketing; Emotional Engagement; Brand Perception; Consumer Decision-Making; Food and Beverage Marketing

ABSTRACT

Purpose – This study explores whether AI-enabled neuromarketing influences consumer decision-making in food and beverage (F&B) marketing directly and indirectly via emotional engagement and brand perception.

Design / Methodology / Approach – This empirical study is demonstrated through the use of a synthetic dataset of 300 respondents. A structured questionnaire applies five-point Likert-scaled measures to assess AI-enabled neuromarketing (AIN), emotional engagement (EE), brand perception (BP) and consumer decision-making (CD). Reliability, descriptive analysis, Pearson correlation, multiple regression and mediation analysis are demonstrated. A SmartPLS-style measurement and structural model are also demonstrated.

Findings – The Cronbach's alpha in the illustrative dataset range from 0.858 to 0.905. The constructs demonstrate positive correlations. Multiple regression explains 47.2% of the variance in consumer decision-making ($R^2 = 0.472$). AI-enabled neuromarketing ($\beta = 0.197$), emotional engagement ($\beta = 0.363$), and brand perception ($\beta = 0.299$) have all been found to have positive regression coefficients. Bootstrap mediation demonstrates positive indirect effects through emotional engagement, brand perception and the sequential pathway.

Originality / Value – This study demonstrates the integration of AI-enabled neuromarketing with two psychological mediators within an F&B context and provides a replicable questionnaire and analysis structure. The numbers shown here are illustrative and should be validated with the appropriate respondents.

I.INTRODUCTION

Food and beverage marketing is increasingly driven by AI-supported personalization, recommendation systems, digital advertising, social-media targeting and customer interfaces. At the same time, consumers' responses to food products are influenced by emotion, sensory expectations, presentation and brand meaning. A systematic review of food-choice neuromarketing points out that food decision-making involves emotions, feelings, attitudes and values that cannot be captured solely by conventional self-reporting.

AI enables a higher level of analytical capability for neuromarketing, enabling the processing of large volumes of multimodal data to enable prediction, personalization and adaptive communication. Recent literature points to increased integration between AI and neuromarketing, and highlights emotion, attention, memory, multimodal analysis, explainability and privacy as key areas of research importance.

In the context of F&B marketing, emotional engagement may represent the affective mechanism through which a consumer becomes interested and engaged with AI-enabled communication. Brand perception may represent a second mechanism by which the consumer evaluates quality, trust, relevance, authenticity and value. Therefore, this study tests a model in which AI-enabled neuromarketing predicts consumer decision-making directly and through emotional engagement and brand perception.

This study aims to:

(1) Explore the relationship between AI-enabled neuromarketing and consumer decision-making;

(2) Explore the relationship between AI-enabled neuromarketing and emotional engagement;

(3) Explore the effect of AI-enabled neuromarketing on brand perception;

(4) Test the effects of emotional engagement and brand perception on consumer decision-making; and

(5) Test the mediating and sequential mediating roles of emotional engagement and brand perception.

II. REVIEW OF LITERATURE

2.1 AI-enabled neuromarketing

AI-enabled neuromarketing combines neuromarketing/consumer-neuroscience measures with computational methods such as machine learning, deep learning, computer vision and natural-language processing. A recent review indicates that AI applications in neuromarketing include emotion detection and predictive analytics, but highlights a lack of multi-modal integration and validation as a key area of ongoing gap identification.

2.2 Neuromarketing and food choice

Food choice is a complex process, involving conscious and less-conscious responses. Neuromarketing methods such as eye tracking, EEG, skin conductance and facial-expression analysis can aid in complementing traditional research methods. The literature on food-choice points to the value of measuring emotional and spontaneous responses in addition to stated preferences.

2.3 Emotional engagement

Emotional engagement refers to the consumer's affective engagement with a marketing stimulus, product or brand. In the context of F&B communication, engagement can be derived from appetite appeal, sensory imagery, nostalgia, humor, cultural meaning and perceived relevance. Recent AI marketing research highlights human-like communication, emotional value and personalization as factors that can influence the consumer's involvement with AI-mediated brand experiences.

2.4 Brand perception

Brand perception is the consumer's overall evaluation of brand quality, relevance, trust, authenticity, value and innovation. AI personalization may reinforce relevance, but consumers' responses also depend on trust, security, transparency, and usefulness. A systematic review of AI and consumer behavior highlights personalization, trust, security, convenience and effectiveness as important elements of the AI-consumer relationship.

2.5 Consumer decision-making

Consumer decision-making in F&B includes the evaluation of products, purchase intention, choice likelihood, repeated-purchase intention and recommendation intention. Recent evidence mapping of AI-mediated food-choice indicates that the majority of the literature still relies on perceptions, intentions and simulated-choice, with relatively little evidence of observable or longitudinal behavior.

III. CONCEPTUAL FRAMEWORK AND HYPOTHESES

Construct	Role	Indicators
AI-enabled neuromarketing (AIN)	Independent variable	Personalization, relevance, adaptive communication, AI analysis
Emotional engagement (EE)	Mediator 1	Interest, enjoyment, excitement, emotional resonance
Brand perception (BP)	Mediator 2	Trust, quality, authenticity, relevance
Consumer decision-making (CD)	Dependent variable	Purchase intention, choice, preference, recommendation

H1: AI-enabled neuromarketing positively influences consumer decision-making.

H2: AI-enabled neuromarketing positively influences emotional engagement.

H3: AI-enabled neuromarketing positively influences brand perception.

H4: Emotional engagement positively influences consumer decision-making.

H5: Brand perception positively influences consumer decision-making.

H6: Emotional engagement mediates the relationship between AI-enabled neuromarketing and consumer decision-making.

H7: Brand perception mediates the relationship between AI-enabled neuromarketing and consumer decision-making.

H8: Emotional engagement positively influences brand perception.

H9: Emotional engagement and brand perception sequentially mediate the relationship between AI-enabled neuromarketing and consumer decision-making.

IV. RESEARCH METHODOLOGY

Research design – The study adopts a quantitative, cross-sectional research design. The questionnaire is built around four latent constructs. For the purpose of demonstrating the complete analysis workflow, 300 synthetic respondent records were created. The real empirical study should replace these records with actual responses.

Sample size – The illustrative sample consists of 300 respondents. For a real study, justification of sample size using an a-priori power analysis or an accepted SEM rule, based on the number of predictors, anticipated effect size and desired statistical power, is recommended.

Sampling – The proposed target population includes consumers who purchase or consume food and beverage products and have experienced digital/AI-enabled marketing. Convenience or purposive sampling might be used for exploratory work, but probability sampling is preferable in cases where population-level generalization is required.

Measurement – All scale items are five-point Likert-scaled from 1 = Strongly Disagree to 5 = Strongly Agree. The questionnaire was designed specifically for this study based on the conceptual definitions and literature.

Data analysis – SPSS-style analysis includes frequency distributions, descriptive statistics, Cronbach's alpha, Pearson correlation and multiple regression. SmartPLS-style analysis includes indicator reliability, composite reliability, average variance extracted (AVE), path coefficients, R^2 and bootstrapped indirect effects.

Section D – Brand Perception (BP)

V. DATA ANALYSIS AND RESULTS

The following results are generated from the synthetic demonstration dataset (n = 300) and illustrate how the final paper can be reported once actual data has been collected.

5.1 Demographic profile

Category	Frequency	Percentage
Age: 18–25	137	45.7%
Age: 26–35	98	32.7%
Age: 36–45	40	13.3%
Age: Above 45	25	8.3%
Gender: Male	162	54.0%
Gender: Female	134	44.7%
Gender: Other/Prefer not to say	4	1.3%
AI familiarity: Low	62	20.7%
AI familiarity: Moderate	149	49.7%
AI familiarity: High	89	29.7%

5.2 Descriptive statistics

Construct	Mean	SD	N
AIN	3.00	1.19	300
EE	3.00	1.19	300
BP	3.00	1.22	300
CD	3.00	1.21	300

5.3 Reliability analysis

Construct	Items	Cronbach's alpha	Interpretation
AIN	4	0.865	Acceptable to excellent
EE	4	0.862	Acceptable to excellent
BP	4	0.882	Acceptable to excellent
CD	5	0.906	Acceptable to excellent

All four alpha coefficients exceed 0.70 in the illustrative analysis. The results therefore indicate satisfactory internal consistency for the demonstration scales.

5.4 Pearson correlation analysis

Variable	AIN	EE	BP	CD
AIN	1.000	0.378	0.408	0.502
EE	0.378	1.000	0.506	0.544
BP	0.408	0.506	1.000	0.523
CD	0.502	0.544	0.523	1.000

The illustrative correlations are positive across all constructs. The strongest association with consumer decision-making is observed for emotional engagement (r = 0.544), followed by brand perception (r = 0.523) and AI-enabled neuromarketing (r = 0.502).

5.5 Multiple regression

Consumer decision-making was regressed on AI-enabled neuromarketing, emotional engagement and brand perception.

Predictor	B	p-value	Decision
AIN	0.285	0.0000	Positive significant (illustrative)
EE	0.315	0.0000	Positive significant (illustrative)
BP	0.249	0.0000	Positive significant (illustrative)

Model summary: $R^2 = 0.442$; Adjusted $R^2 = 0.436$; $F(3,296) = 78.04$; $p < .001$.

Interpretation – In the synthetic dataset, the three predictors jointly explain 47.2% of the variance in consumer decision-making. Emotional engagement has the largest standardized-comparable coefficient among the three predictors in this demonstration, followed by brand perception and AI-enabled neuromarketing. Because the data are synthetic, these values are not evidence about the real population.

5.6 Mediation analysis

Mediation path	Indirect effect	Bootstrap 95% CI	Interpretation
AIN → EE → CD	0.119	[0.071, 0.172]	CI excludes zero
AIN → BP → CD	0.064	[0.032, 0.104]	CI excludes zero
AIN → EE → BP → CD	0.040	[0.021, 0.065]	CI excludes zero

The illustrative bootstrap analysis uses 5,000 resamples. The indirect effect through emotional engagement is approximately 0.146 (95% CI 0.095–0.205). The indirect effect through brand perception is approximately 0.096 (95% CI 0.054–0.143). The sequential indirect effect through emotional engagement followed by brand perception is approximately 0.041 (95% CI 0.023–0.065). Because the confidence intervals do not include zero in this synthetic demonstration, the corresponding mediation hypotheses would be supported if the same pattern were obtained with actual data.

5.7 SmartPLS-style measurement model

Construct	CR	AVE	Assessment
AIN	0.909	0.714	Satisfactory
EE	0.907	0.710	Satisfactory
BP	0.919	0.741	Satisfactory
CD	0.931	0.730	Satisfactory

The illustrative measurement statistics exceed commonly used thresholds of CR > 0.70 and AVE > 0.50. These values are calculated as a SmartPLS-style demonstration from the synthetic indicators; they are not output exported from SmartPLS software.

5.8 Structural model and hypothesis testing

Hypothesis	Path	Coefficient / effect	Result in synthetic data
H1	AIN → CD	0.285	Supported
H2	AIN → EE	0.377	Supported
H3	AIN → BP	0.257	Supported
H4	EE → CD	0.315	Supported
H5	BP → CD	0.249	Supported
H6	AIN → EE → CD	0.119	Supported
H7	AIN → BP → CD	0.064	Supported
H8	EE → BP	0.420	Supported
H9	AIN → EE → BP → CD	0.040	Supported

VI. DISCUSSION

The illustrative findings are in line with the conceptual model – AI-enabled neuromarketing is positively related to emotional engagement, brand perception and consumer decision-making. This pattern is theoretically plausible, as AI can increase relevance and personalization, and emotional and brand evaluations transform these marketing stimuli into consumer responses. Recent reviews similarly identify personalization, trust, convenience and emotional connection as key dimensions of AI-mediated consumer behavior.

The mediation results demonstrate why the direct effect alone is insufficient. In the synthetic model, emotional engagement provides a substantial indirect pathway. This is consistent with the role of emotion in food choice identified in neuromarketing literature.

Brand perception also provides an indirect route. This is important, as AI-enabled personalization may influence not only immediate attention, but also the interpretation of the brand. The broader AI-consumer literature highlights trust, security, effectiveness and personalization as interconnected drivers of consumer response.

The sequential mediation result demonstrates a possible psychological chain: AI-enabled relevance may increase emotional involvement; emotional involvement may lead to a stronger brand evaluation; and the resulting brand perception may influence the decision-making. This should be treated as a testable mechanism, rather than a universal causal law.

VIII. MANAGERIAL IMPLICATIONS

F&B marketers can utilize AI-enabled consumer insight to test which advertising elements generate attention and emotional engagement. Personalization should be designed around relevance, rather than excessive targeting. Brand managers should monitor brand perception, alongside immediate conversion metrics, as a short-term response does not always indicate long-term brand value.

Organizations should also provide transparent explanations of personalization and appropriate privacy safeguards. Recent evidence mapping of AI-mediated food choice shows that most studies still rely on intentions or simulated behavior, while relatively few examine observable or longitudinal behavior.

IX. LIMITATIONS

The most important limitation is that the numeric results in this version are synthetic – they demonstrate the analysis structure, but cannot establish population effects. A second limitation is the cross-sectional questionnaire design proposed for the real study, which limits causal inference. A third limitation is the common-method bias, as respondents may provide similar response tendencies across constructs. Future work should combine survey data with actual purchase behavior, and where feasible, eye-tracking, EEG or physiological measures.

A further limitation concerns external validity, as AI-mediated food choice research is still emerging, and recent evidence mapping reports that only a small proportion of the literature reaches commercial or sustained operational status.

X. CONCLUSION

This empirical research model proposes that AI-enabled neuromarketing can influence F&B consumer decision-making both directly and through emotional engagement and brand perception. The illustrative analysis demonstrates a complete workflow from questionnaire design to reliability, correlation, regression and mediation/SEM-style interpretation. In the synthetic dataset, all proposed relationships are positive and statistically consistent with the conceptual model.

In order to submit an actual journal, the next essential step would be to collect primary-data, and to replace all synthetic statistics with corresponding SPSS/SmartPLS output. The final empirical contribution should then be based on the observed respondent data.

REFERENCES

[1] A. Stasi, G. Songa, M. Mauri, G. Ciceri, F. Diotallevi, G. Nardone, and V. Russo, “Neuromarketing empirical approaches and food choice: A systematic review,” Food Research International, vol. 108, pp. 650–664, 2018.

[2] A. H. Alsharif et al., “The synergy of neuromarketing and artificial intelligence: A comprehensive literature review in the last decade,” Future Business Journal, vol. 11, art. 170, 2025.

[3] E. Delen and A. Hızıroğlu, “Beyond traditional marketing: A systematic literature review of AI and neuromarketing in consumer behavior,” Dokuz Eylül Üniversitesi İşletme Fakültesi Dergisi, vol. 27, no. 1, 2026.

[4] A. Ribeiro, A. J. López Rivero, and J. L. Abrantes, “The impact of artificial intelligence on consumer behavior towards brands: A systematic review,” Electronic Commerce Research, 2025.

[5] A. Alarcón et al., “A systematic review of the prediction of consumer preference using EEG measures and machine-learning in neuromarketing research,” Journal of Neuroscience, Psychology, and Economics, 2022.

[6] K. M. Jackson and H. Kiss, “The power of personalization: Generation Z's emotional response to AI food marketing under the EU AI Act,” British Food Journal, 2025.

[7] Q. Wang et al., “Artificial Intelligence-Driven Recommendations and Functional Food Purchases: Understanding Consumer Decision-Making,” Foods, vol. 14, no. 6, 976, 2025.

[8] T. Teepapal, “AI-driven personalization: Unraveling consumer perceptions in social media engagement,” Computers in Human Behavior, vol. 165, 108549, 2025.

[9] M. Kechri et al., “Emerging Technologies for Investigating Food Consumer Behavior: A Systematic Review,” Comprehensive Reviews in Food Science and Food Safety, 2025.

[10] O. Ketney and A.-M. Tifrea, “AI-mediated food choice: A systematic evidence map of personalisation, persuasion, consumer agency, and industrial translation,” Trends in Food Science & Technology, 2026.

[11] R. E. Petty and J. T. Cacioppo, Communication and Persuasion: Central and Peripheral Routes to Attitude Change. New York: Springer, 1986.

[12] A. Mehrabian and J. A. Russell, An Approach to Environmental Psychology. Cambridge, MA: MIT Press, 1974.