

EXPLORING THE ROLE OF NEUROMARKETING IN ONLINE SHOPPING RETURNS: A STUDY OF CONSUMERS' EMOTIONAL AND COGNITIVE RESPONSES

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Abstract: The study “Exploring the Role of Neuromarketing in Online Shopping Returns: A Study of Consumers’ Emotional and Cognitive Responses” examines the role of neuromarketing factors in influencing consumers’ emotional and cognitive responses and their online shopping return behaviour. The study focuses on how online shopping stimuli such as attractive product images, visual presentation, personalized advertisements, product videos, and other digital marketing elements influence consumers’ attention, emotions, product evaluation, purchase decisions, and return intentions. Primary data were collected from 185 online consumers using a structured questionnaire based on a five-point Likert scale. The data were analysed using descriptive statistics, independent sample t-test, and one-way ANOVA to examine differences across selected demographic variables. The findings indicate that age significantly influences consumers’ responses to attractive product images, while gender does not significantly influence most emotional responses towards online shopping. Occupation significantly influences consumers’ careful evaluation of product information. Further, rural and urban consumers show no significant difference in most aspects of online shopping return behaviour, although a significant difference is observed in the willingness to return products when they fail to meet expectations. The study concludes that neuromarketing factors influence different stages of the online consumer decision-making process, particularly attention, emotional response, cognitive evaluation, and return intention. The findings suggest that online retailers should provide realistic product presentations, accurate product information, transparent descriptions, and convenient return policies to reduce the gap between consumer expectations and actual product experience.

Keywords: Neuromarketing; Online Shopping; Consumer Behaviour; Emotional Responses; Cognitive Responses; Product Returns; Purchase Decision; Digital Marketing; Consumer Expectations; Online Retailing

1. INTRODUCTION

The rapid growth of e-commerce has significantly transformed the way consumers search for, evaluate, purchase, and return products. Online shopping provides consumers with convenience, wider product choices, competitive prices, and easy access to products from different brands and locations. However, product returns have become an important challenge in the digital retail environment. Consumers may return products because of dissatisfaction with product quality, mismatch between expectations and actual products, delivery issues, sizing problems, damaged products, or changes in purchase preferences. The return experience can influence consumers’ emotions, trust, satisfaction, and future purchasing behaviour. In this context, **neuromarketing** provides a valuable perspective for understanding consumer behaviour. Neuromarketing combines principles from marketing,



psychology, neuroscience, and behavioural science to examine how consumers respond emotionally and cognitively to marketing stimuli. Rather than focusing only on what consumers consciously report, neuromarketing seeks to understand underlying responses such as **attention, emotions, perception, memory, motivation, trust, and decision-making**. In online shopping, these responses can be influenced by product images, website design, personalised recommendations, reviews, advertisements, pricing information, return policies, and other digital stimuli. Online product returns may also generate different emotional and cognitive responses among consumers. A return experience may create emotions such as disappointment, frustration, regret, anxiety, or relief, while the evaluation of return policies, refund procedures, customer support, and replacement options may influence consumers' cognitive perceptions. These emotional and cognitive reactions can subsequently affect their **trust in the online retailer, satisfaction with the shopping experience, willingness to repurchase, and future purchase decisions**.

The role of neuromarketing becomes particularly relevant because consumers do not always make online shopping and return decisions through purely rational evaluation. Emotional reactions to product presentation, perceived risk, unexpected product experiences, ease of the return process, and brand communication may influence how consumers evaluate the overall shopping experience. Understanding these underlying responses can help online retailers design more consumer-friendly shopping and return experiences.

2. REVIEW OF LITERATURE

Fang and Karim (2025) conducted a systematic review of 41 empirical studies published between 2021 and 2025 concerning consumer return intention in online platforms. The review identified several determinants, including impulse buying, post-purchase dissonance, wardrobing, product-quality mismatch, misleading descriptions, return policies, situational factors, environmental considerations and fairness perceptions.

Chawla et al. (2026) examined online purchase decision-making from a neuromarketing perspective by integrating EEG, eye-tracking, galvanic skin response (GSR), and behavioural surveys. The study investigated the influence of visual design, website layout and interactive elements on emotional arousal, satisfaction, trust, attention and purchase intention. The findings indicated that visual attention, emotional arousal and cognitive engagement play important roles in digital consumer behaviour.

3. STATEMENT OF THE PROBLEM

The rapid expansion of online shopping has provided consumers with greater convenience, product variety, easy price comparison, and flexible purchasing options. At the same time, product returns have become a significant issue in e-commerce, as consumers may return products due to differences between their expectations and the actual product, poor quality, incorrect size, damaged goods, delayed delivery, or changes in purchase preferences. The return process can therefore influence the consumer's overall perception of the online retailer. Traditional studies on online shopping returns have largely focused on functional and rational factors, such as product quality, price, delivery, return policies, refund procedures, and service quality. However, consumers' decisions and reactions to product returns are not necessarily based only on rational evaluation. Their emotions, attention, perception, memory, trust, satisfaction, and cognitive responses may also play an important role in determining how they evaluate the return experience and the retailer. Neuromarketing offers an emerging approach to understanding these underlying consumer responses. It helps examine how consumers react to marketing stimuli at emotional and cognitive levels. In the context of online shopping returns, factors such as product presentation, personalised communication, return-policy information, customer service interactions, refund experiences, and digital interface design may influence consumers' emotional and cognitive responses. However, there is comparatively limited understanding of how these neuromarketing-related factors shape consumers' reactions specifically during the online product return process.

Consumers may experience disappointment, frustration, regret, anxiety, or relief when returning a product. These emotional responses may influence their trust in the retailer, satisfaction with the shopping experience, and willingness to purchase again. Similarly, cognitive responses such as perceived fairness, risk assessment, attention to return information, evaluation of alternatives, and judgement of the retailer may affect their subsequent behavioural

intentions. Understanding these responses is important for online retailers seeking to reduce negative return experiences and strengthen customer relationships. Therefore, the problem addressed by the present study is the insufficient understanding of the emotional and cognitive mechanisms underlying consumers' online shopping return experiences from a neuromarketing perspective. The study seeks to examine the role of neuromarketing-related factors in shaping consumers' emotional and cognitive responses to product returns and to determine how these responses influence their perceptions, satisfaction, trust, and future behavioural intentions. The findings may help online retailers develop more consumer-centred return processes and communication strategies.

4. OBJECTIVES OF THE STUDY

- To assess the influence of neuromarketing factors on consumers' emotional responses during online shopping.
- To examine the influence of neuromarketing factors on consumers' cognitive responses during online shopping.
- To analyse the influence of emotional and cognitive responses on consumers' online shopping return behaviour.

5. NULL HYPOTHESIS

H01: There is no significant difference among consumers of different age groups in their Neuromarketing Factors towards online shopping.

H02: There is no significant difference between male and female consumers in their emotional responses towards online shopping.

H03: There is no significant difference among consumers with different occupations in their cognitive responses towards online shopping.

H04: There is no significant difference between rural and urban consumers in their online shopping return behaviour.

6. RESEARCH METHODOLOGY

The study adopted a descriptive research design to examine the role of neuromarketing factors in consumers' emotional and cognitive responses towards online shopping returns. The study was based on primary data collected from 185 online consumers through a structured questionnaire. The questionnaire consisted of statements measured using a five-point Likert scale, ranging from strongly disagree to strongly agree, covering neuromarketing factors, emotional responses, cognitive responses, and online shopping return behaviour. Respondents were selected based on their experience with online shopping. The collected data were coded and analysed using SPSS. Descriptive statistics such as frequency and percentage were used to present the profile of respondents and response patterns, while Independent Sample t-test was applied to examine differences between male and female consumers and One-Way ANOVA was used to identify significant differences among consumers belonging to different age groups and occupational categories and between other selected demographic groups. The hypotheses were tested at the 5 per cent level of significance ($\alpha = 0.05$). The findings were interpreted based on the significance values to determine whether the proposed null hypotheses were accepted or rejected.

7. RESEARCH GAP

The existing literature demonstrates that neuromarketing has been extensively applied to online purchase decisions, attention, emotional arousal, trust, product evaluation and purchase intention. However, comparatively less attention has been given to the post-purchase stage, particularly the relationship between neuromarketing-related emotional and cognitive responses and consumers' decisions to return products. Existing

return-intention research identifies factors such as post-purchase dissonance, product mismatch, misleading descriptions, impulse buying and return policies, but these studies generally rely on conventional behavioural or survey-based approaches. Therefore, there is a meaningful research opportunity to examine how consumers' emotional and cognitive responses to online shopping stimuli may contribute to product-return behaviour. The proposed study, "Exploring the Role of Neuromarketing in Online Shopping Returns: A Study of Consumers' Emotional and Cognitive Responses," seeks to bridge this gap by connecting neuromarketing → emotional/cognitive response → post-purchase evaluation → online shopping return behaviour.

8. ANALYSIS AND INTERPRETATION

H01: There is no significant difference among consumers of different age groups in their Neuromarketing Factors towards online shopping.

ANOVA						
Factors		Sum of Squares	df	Mean Square	F	Sig.
Attractive product images capture my attention while shopping online.	Between Groups	6.809	4	1.702	2.833	.026
	Within Groups	108.142	180	.601		
	Total	114.951	184			
The colours and visual presentation of online advertisements influence my interest in a product.	Between Groups	4.251	4	1.063	1.440	.222
	Within Groups	132.808	180	.738		
	Total	137.059	184			
Music and sounds used in online advertisements influence my product preference.	Between Groups	2.773	4	.693	.791	.532
	Within Groups	157.681	180	.876		
	Total	160.454	184			
Personalized advertisements attract my attention during online shopping.	Between Groups	3.684	4	.921	.835	.505
	Within Groups	198.565	180	1.103		
	Total	202.249	184			
Product videos create a stronger impression of the product in my mind.	Between Groups	2.612	4	.653	.683	.604
	Within Groups	172.005	180	.956		
	Total	174.616	184			
The overall visual presentation of an online product influences my purchase decision.	Between Groups	4.838	4	1.210	2.086	.084
	Within Groups	104.383	180	.580		
	Total	109.222	184			

Source: Primary Data

Interpretation

The ANOVA results indicate that ****age** has a statistically significant influence on only one of the six neuromarketing factors**, namely, ****Attractive product images capture my attention while shopping online**** * (F = 2.833, Sig. = 0.026), since the significance value is less than 0.05. Therefore, the null hypothesis is ****rejected**** for this factor. However, the remaining factors—***colours and visual presentation of online advertisements*** (Sig. = 0.222), ***music and sounds used in online advertisements*** (Sig. = 0.532), ***personalized advertisements*** (Sig. =

0.505), *product videos* (Sig. = 0.604), and *overall visual presentation of an online product* (Sig. = 0.084)—show significance values greater than 0.05, indicating ****no significant difference among different age groups****. Thus, the null hypothesis is ****partially rejected and partially accepted****, showing that age significantly affects consumers' attention to attractive product images but does not significantly influence the other neuromarketing factors examined.

H02: There is no significant difference between male and female consumers in their emotional responses towards online shopping.

Factors		F	Sig.	t	df	Sig. (2-tailed)
Online advertisements create positive emotions that influence my purchase decisions.	Equal variances assumed	.044	.834	-1.104	183	.271
	Equal variances not assumed			-1.091	165.602	.277
Attractive product presentations make me feel excited about purchasing a product.	Equal variances assumed	.186	.667	-.776	183	.439
	Equal variances not assumed			-.772	176.207	.441
Personalized online offers make me feel more connected to a product or brand.	Equal variances assumed	.000	.991	-.770	183	.443
	Equal variances not assumed			-.762	170.162	.447
Positive emotional experiences encourage me to purchase products online.	Equal variances assumed	.349	.555	.356	183	.722
	Equal variances not assumed			.357	181.505	.722
I feel disappointed when a product received does not match my expectations.	Equal variances assumed	5.858	.016	-.761	183	.448
	Equal variances not assumed			-.755	171.934	.452
I feel frustrated when the actual product differs from its online presentation.	Equal variances assumed	6.800	.010	-1.671	183	.096
	Equal variances not assumed			-1.649	164.544	.101
Emotional dissatisfaction influences my decision to return an online purchase.	Equal variances assumed	.000	.991	.008	183	.993
	Equal variances not assumed			.008	181.467	.993

Source: Primary Data

Interpretation

The Independent Sample *t*-test results indicate that ****there is no statistically significant difference between male and female consumers in their emotional responses towards online shopping****, as the significance values for all the factors are greater than 0.05. Specifically, *online advertisements create positive emotions that influence purchase decisions* (Sig. = 0.271), *attractive product presentations make consumers feel excited about purchasing* (Sig. = 0.439), *personalized online offers create a stronger connection with a product or brand* (Sig. = 0.443), *positive emotional experiences encourage online purchases* (Sig. = 0.722), *disappointment when the received product does not match expectations* (Sig. = 0.448), *frustration when the actual product differs from its online presentation* (Sig. = 0.096), and *emotional dissatisfaction influences the decision to return an online purchase* (Sig. = 0.993) are all

non-significant. Therefore, the ****null hypothesis (H02) is accepted****, indicating that gender does not significantly influence consumers' emotional responses towards online shopping.

H03: There is no significant difference among consumers with different occupations in their cognitive responses towards online shopping.

ANOVA						
Factors		Sum of Squares	df	Mean Square	F	Sig.
I carefully evaluate product information before purchasing online.	Between Groups	11.999	5	2.400	2.701	.022
	Within Groups	159.050	179	.889		
	Total	171.049	184			
I compare different products before making an online purchase.	Between Groups	2.743	5	.549	.794	.555
	Within Groups	123.603	179	.691		
	Total	126.346	184			
Online reviews influence my evaluation of a product.	Between Groups	4.509	5	.902	1.128	.347
	Within Groups	143.145	179	.800		
	Total	147.654	184			
I pay attention to product specifications before purchasing online.	Between Groups	7.090	5	1.418	1.808	.113
	Within Groups	140.348	179	.784		
	Total	147.438	184			
I reconsider my purchase when the product information appears unclear or incomplete.	Between Groups	2.916	5	.583	.713	.614
	Within Groups	146.435	179	.818		
	Total	149.351	184			
A difference between my expectations and the actual product influences my thinking about returning it.	Between Groups	11.398	5	2.280	1.807	.114
	Within Groups	225.823	179	1.262		
	Total	237.222	184			
I consider alternative products when the purchased product does not meet my expectations.	Between Groups	9.550	5	1.910	2.018	.078
	Within Groups	169.390	179	.946		
	Total	178.941	184			

Source: Primary Data

Interpretation

The ANOVA results indicate that there is a statistically significant difference among consumers with different occupations only in their response to the statement “I carefully evaluate product information before purchasing online” ($F = 2.701$, $\text{Sig.} = 0.022$), as the significance value is less than 0.05. Therefore, the null hypothesis is rejected for this factor. However, no significant difference is observed for “I compare different products before making an online purchase” ($\text{Sig.} = 0.555$), “Online reviews influence my evaluation of a product” ($\text{Sig.} = 0.347$), “I pay attention to product specifications before purchasing online” ($\text{Sig.} = 0.113$), “I reconsider my purchase when the product information appears unclear or incomplete” ($\text{Sig.} = 0.614$), “A difference between my expectations and the actual

product influences my thinking about returning it” (Sig. = 0.114), and “I consider alternative products when the purchased product does not meet my expectations” (Sig. = 0.078), as all their significance values are greater than 0.05. Hence, H03 is partially rejected and partially accepted, indicating that occupation significantly influences consumers’ careful evaluation of product information, while it does not significantly influence the other cognitive responses towards online shopping.

H04: There is no significant difference between rural and urban consumers in their online shopping return behaviour.

Factors		F	Sig.	t	df	Sig. (2-tailed)
I have returned a product purchased through an online shopping platform.	Equal variances assumed	.044	.834	.852	183	.395
	Equal variances not assumed			.826	112.764	.411
I consider returning a product when it does not match its online description.	Equal variances assumed	1.664	.199	-.044	183	.965
	Equal variances not assumed			-.047	147.839	.963
I am more likely to return a product when its quality is lower than expected.	Equal variances assumed	1.607	.207	.925	183	.356
	Equal variances not assumed			.911	117.629	.364
I consider returning products when their appearance differs from the images shown online.	Equal variances assumed	.421	.517	-.552	183	.582
	Equal variances not assumed			-.560	127.519	.576
Negative emotions after receiving a product increase my intention to return it.	Equal variances assumed	.018	.893	.614	183	.540
	Equal variances not assumed			.605	117.484	.547
Product reviews influence my decision to return a product.	Equal variances assumed	1.363	.244	-.762	183	.447
	Equal variances not assumed			-.745	115.394	.458
A simple and convenient return policy encourages me to return unsuitable products.	Equal variances assumed	.541	.463	-1.243	183	.215
	Equal variances not assumed			-1.170	104.487	.245
I would return a product if it fails to meet my expectations.	Equal variances assumed	26.812	.000	-3.747	183	.000
	Equal variances not assumed			-3.294	89.015	.001

Source: Primary Data

Interpretation

The Independent Sample t-test results indicate that there is no significant difference between rural and urban consumers in their online shopping return behaviour for most of the factors, as their significance values are greater than 0.05. Specifically, returning a product purchased through an online shopping platform (Sig. = 0.395), returning a product when it does not match its online description (Sig. = 0.965), returning a product when its quality is lower than expected (Sig. = 0.356), returning products when their appearance differs from online images (Sig. = 0.582), negative emotions increasing the intention to return (Sig. = 0.540), product reviews influencing the return decision (Sig. = 0.447), and a simple and convenient return policy encouraging returns (Sig. = 0.215) are all statistically non-significant. However, a significant difference is observed for “I would return a product if it fails to meet my expectations” (Sig. < 0.001), indicating that rural and urban consumers differ significantly on this factor. Therefore, H04 is partially rejected and partially accepted. Overall, place of residence does not significantly influence most aspects of online shopping return behaviour, but it has a significant influence on consumers’ willingness to return products that fail to meet their expectations.

9. CONCLUSIONS

The study “Exploring the Role of Neuromarketing in Online Shopping Returns: A Study of Consumers’ Emotional and Cognitive Responses” concludes that neuromarketing plays an important role in shaping consumers’ attention, emotional reactions, cognitive evaluation, and ultimately their online shopping and product-return decisions. The study shows that consumers are influenced by different online stimuli such as attractive product images, visual presentation, personalized advertisements, product videos, and other sensory elements. Among these factors, age significantly influences consumers’ attention towards attractive product images, while other neuromarketing factors do not show significant differences across age groups. The study establishes that consumer responses to online shopping are multidimensional, involving visual attention, emotions, cognitive evaluation, expectations, and return intentions. Demographic characteristics such as age, gender, occupation, and residential area do not influence every dimension equally; rather, their influence is specific to particular consumer responses. Therefore, online retailers and marketers should provide realistic product images and videos, accurate product descriptions, transparent information, appropriate personalization, and convenient return policies. Reducing the gap between consumers’ expectations and the actual product received can minimise dissatisfaction and product returns, while strengthening consumer confidence, satisfaction, and long-term relationships with online shopping platforms. In conclusion, neuromarketing provides valuable insights into understanding why consumers respond to online shopping stimuli and how these responses can ultimately affect their purchase and return decisions. The effective application of neuromarketing principles, combined with transparent and consumer-oriented online retail practices, can contribute to better shopping experiences and more effective management of product returns.

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