Research Article

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Relationship between Neuromarketing and Online Purchasing Decisions of Peruvian Consumers in the Post-Pandemic Era

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Abstract

The pandemic has accelerated the transition toward e-commerce, highlighting the necessity of understanding how neuromarketing affects online purchasing decisions. This quantitative study, based on a correlational and cross-sectional design, explored the relationship between neuromarketing and purchasing decisions in virtual stores in northern Peru. Using a 40-item questionnaire, data from 498 adults in La Libertad and Lambayeque were collected. The analyses revealed significant correlations between cognition attention and the information search (rho=0.58) and alternative evaluation phases (rho=0.53), between emotion and the postpurchase stage (rho=0.54), and between memory and the recognition of need (rho=0.57), in addition to a strong direct association between cognition attention and the overall influence of neuromarketing on purchasing decisions (rho=0.72). These findings underscore the considerable impact of sensory and emotional experiences generated by neuromarketing on the critical stages of the purchasing behavior of Peruvian digital consumers, pointing to its relevance in enhancing customer satisfaction and loyalty in the digital age. In conclusion, various components of neuromarketing, specifically linked to the generation of pleasant and memorable sensory experiences, have a significant influence on the search, evaluation, and postpurchase satisfaction behaviors of virtual consumers in the region studied.

Keywords: *Neuromarketing, purchase decision, e-commerce, digital marketing*

1. Introduction

The outbreak of the COVID-19 pandemic has served as a catalyst for an accelerated transition toward e-commerce, thus redefining consumer-brand interactions. In light of this crisis, companies have been compelled to reassess and adjust their business and marketing strategies to the digital environment, facing the challenge of deciphering and acting according to changing consumption trends (Masoud & Basahel, 2023; Sheth, 2020; Vecchio et al., 2018). Neuromarketing has emerged as a key tool during the health crisis for understanding digital consumers and their behavior in an increasingly virtual market. However, there is a deficit of studies that delve into its impact on online purchasing, particularly in Latin America, where factors such as investment and the availability of experts limit its implementation (Chipantiza Sulqui, 2017; Olivar Urbina, 2020). Over time, accumulated studies have consolidated the premise that emotions play a more decisive role than rationality in purchasing decisions (Sharma et al., 2010). This has generated great interest in developing neuromarketing strategies to influence consumer purchase decisions (Lim, 2018; Stanton et al., 2017).

The adaptation of companies to the digital environment during the pandemic involves not only the adoption of advanced technological tools but also a deep understanding of the psychology of the digital consumer (Béjar-Tinoco et al., 2022; Laguna de Paz, 2023). The northern region of Peru, characterized by its economic and cultural diversity, presents an ideal scenario for exploring how neuromarketing can influence online purchase decisions, considering both local particularities and global trends in digital consumption. The pandemic has accelerated the shift to e-commerce, presenting challenges for brands in capturing consumer attention and enhancing digital purchasing. Previously, neuromarketing in Latin America faced limitations due to a lack of resources and expertise.

With the growth of e-commerce, it is crucial to refine digital marketing strategies to adapt to a dynamic market and avoid saturation of the digital space (Isa et al., 2020; Sayyida et al., 2021). Although the application of neuromarketing in Latin America was initially limited, the notable growth of e-commerce highlights its potential. Therefore, this study contributes to the literature by examining the effectiveness of both variables, focusing on changes in consumer behavior in the postpandemic era, paying special attention to northern Peru, where significant transformations in digital consumption have been observed. This study aims to explore in depth the relationship between neuromarketing and the online purchasing decisions of Peruvian consumers in the postpandemic period. Specifically, the objectives are to analyze the relationships among the following dimensions: cognition-attention with information search (1), cognition-attention with the evaluation of alternatives (2), emotion with the postpurchase stage (3), and memory with the recognition of needs (4). Through these objectives, this study intends to provide empirical evidence that contributes to the understanding of the dynamics between neuromarketing and online purchasing behavior, thus offering guidelines for the implementation of more effective marketing strategies during and after the pandemic.

2. Literature Review

2.1 Neuromarketing: Understanding the Consumer Mind in the Digital Age

Neuromarketing, emerging in the early 21st century with the term's introduction by Ale Smidts in 2002, merges neuroscience and marketing to unravel how consumers make decisions, building on pioneering work such as Gerry Zaltman's use of neuroimaging to analyze consumer behavior (Coca, 2010; Roebuck, 2011). This discipline has demonstrated that our purchase choices are strongly influenced by subconscious factors, challenging the notion of a fully rational consumer and highlighting the importance of perceptions and emotions in the decision-making process (Fisher et al., 2010; Robaina-Calderín & Martín-Santana, 2021). The pandemic accelerated digitalization and

changed brand-consumer interactions, underscoring the significance of neuromarketing in adapting to new dynamics.

This allows companies to understand and respond to shifts in consumer motivations and behaviors through strategies leveraging emotional and psychological insights (Palma et al., 2021). Heatmaps, a prominent tool in neuromarketing, analyze visual attention in digital environments using eye-tracking and neurophysiology, revealing their influence on purchasing decisions (Šola et al., 2022). These techniques have gained popularity for their ability to detail consumer interactions with digital stimuli, aiding in optimizing web design and advertising to enhance attention capture and retention (Consuela-Mădălina et al., 2023; Fu et al., 2023; Ivanova et al., 2021; Šola et al., 2022). The implementation of advanced neuromarketing tools has enhanced digital marketing strategies, especially in e-commerce, by delving into how cognitive and emotional processes affect purchasing decisions (Camerer & Yoon, 2015). Studies on cognition, attention, memory, and emotions have clarified the impact of sensory stimuli and experiences on purchasing behavior, which contributes to intense emotions and brand loyalty (Avendaño Castro et al., 2021; Gao & Bai, 2014; Orellana & Orellana, 2021). Moreover, recent research has shown that postpandemic users pay more attention to banners and advertising content in digital media.

However, their criteria for evaluating and selecting brands differ from those in the prepandemic context (Al-Geitany et al., 2023; Bhat et al., 2021). In Peru, the application of neuromarketing strategies to influence consumer decisions and behavior has been investigated in both digital (Paredes-Pérez et al., 2021) and physical (Ore et al., 2022) environments. These findings highlight the importance of neuromarketing in creating marketing strategies aligned with the Peruvian consumer's subconscious. However, there is still a need for further exploration of this topic due to the transformation of consumer behavior, and a gap exists in understanding how neuromarketing strategies adapt to new consumer expectations. This signals an opportunity to focus more on personalization and cultural context to strengthen online connections between companies and consumers in a digital era transformed by the pandemic.

2.2 Digital consumer behavior and purchase decision making

Consumer behavior is influenced by how the brain processes sensory information, unconsciously affecting our purchasing decisions (Henríquez-Ramírez et al., 2021). Neuromarketing is based on MacLean's triune brain theory, which identifies three sets of brain regions with specific functions (Caetano & Batista, 2022). These three sets—named the reptilian complex, limbic system, and neocortex—have independent logics, appearing and developing in sequence. As a result, each part relates to the others following a hierarchy by age, prioritizing survival functions over higher cognitive processes (Pozharliev et al., 2015; Reiner, 1990). The triune brain theory laid the groundwork for decisional functioning, distinguishing between emotional-instinctive processing and rational deliberations. According to Schwarzkopf (2015), in the United States, during the 1980s, the universities of Minnesota and Northwestern established the first laboratories to investigate consumer behavior, analyzing attention in advertisements.

Neuroscientists have used neurological data to direct consumer attention toward specific products, improving the shopping experience and increasing sales (Cortés, 2021; Salas, 2018). Additionally, internal and external factors such as income and social and cultural aspects are considered in purchasing decisions (Kotler & Armstrong, 2012; Mansoor & Jalal, 2010). Some classic behavioral theories that support this work include Freud's psychoanalytic theory, which focuses on satisfying needs as motivation beyond economic aspects (Schiffman & Kanuk, 2010); Marshall's economic theory on rational purchase decisions (Rivera et al., 2009); and Pavlov's learning behavior theory, which focuses on external stimuli to influence the consumer (Whaibe Medrano et al., 2013). These theories were used by marketers to create a marketing plan using the 4Ps (Gonzales Sulla, 2021). Recent studies on the COVID-19 pandemic revealed an accelerated transformation of consumption habits and a marked increase in online shopping activity (Al-Geitany et al., 2023; Bhat

et al., 2021; Sayyida et al., 2021), and strict confinement led people to move even more everyday activities such as work, education, socialization, and commerce to the online environment (Çiçek & Haroon, 2021). Reports recorded an exponential growth of more than 50% in internet retail sales during the peak of the pandemic (United Nations, 2022).

These virtual consumer trends remain valid in the normality of the new pandemic. Specifically, Bhat et al. (2021) identified through big data analysis on Twitter a 133% increase in mentions of online shopping during the peak of the pandemic. Das et al. (2022) determined that even after strict confinement, more than 75% of surveyed participants in Brazil showed an intention to continue making at least half of their usual product purchases through the internet. The decision process included four phases, which were taken by this study, such as the recognition of the need, information search, evaluation of alternatives, and postpurchase communication, highlighting the importance of emotions at each stage (Bray, 2008; Suleman et al., 2020), each of which is affected by external stimuli that companies can take advantage of in their marketing and sales strategies (Zhang et al., 2023). Additionally, Canales (2018) maintains that emotions are fundamental in purchase decisions from a neurological perspective, significantly influencing how consumers perceive products and services. In addition, studies reveal that during confinement, there was an increase in impulsive purchases linked to emotional factors such as anxiety and boredom, as evidenced in surveys conducted in China and Portugal (Rodrigues et al., 2021; Wang et al., 2021). This situation underscores the importance of need recognition, where neuromarketing plays a key role in providing insights that drive this recognition through effective advertising strategies to capture consumer attention (Adeola et al., 2022; Qi et al., 2023). Subsequently, consumers seek information about products or services through both passive and active means, including review sites and social networks, to make informed decisions (Ismagilova et al., 2020; Nuriman Izudin et al., 2020).

When evaluating options, they consider not only rational factors such as cost and functionality but also emotional links with brands, indicating an integration of analysis and emotions in the purchasing process (Muhammad et al., 2023). After acquiring a product/service, customer perceptions and satisfaction levels regarding their consumption experience versus prior expectations are analyzed (Dwivedi et al., 2021). Postpurchase feedback is also valuable for studying repurchase possibilities and loyalty to a brand (Muhammad et al., 2023). The literature highlights various influences of neuromarketing on digital consumers but lacks a postpandemic focus and in specific contexts such as Peru. This study addresses these gaps by analyzing changes in consumption and the effectiveness of digital neuromarketing postpandemic, with an emphasis on Peruvian cultural adaptation. Hypotheses are proposed on how the cognitive and emotional elements of neuromarketing impact purchase decisions and brand loyalty, seeking to contribute to the knowledge of its dynamic relationship with purchasing behavior.

3. Methodology

This study uses a quantitative method to explore how neuromarketing affects online purchase decisions and relies on statistical analysis to evaluate specific hypotheses (Hernández-Sampieri and Mendoza, 2018). It is defined as basic research, following Valderrama (2013), with the objective of expanding knowledge about the impact of neuromarketing on digital consumers without focusing on immediate practical applications. This study highlights the correlation between key variables to understand online consumer behavior in northern Peru.

3.1 Sample

The population consisted of 2,204,496 citizens of La Libertad (1'345,576) and Lambayeque (858,920) according to the latest report of the population of voting age from 18 to 70 years estimated and projected to June 30, 2022 (INEI PERU, 2022). The sample was nonprobabilistic by convenience (Hernández-Sampieri & Mendoza, 2018), represented by 498 participants who met the criteria.

3.2 Data collection instruments

The questionnaire was divided into two main parts and composed of a total of 40 items. The tool was distributed digitally through online forms and e-mail. The first part, with 20 items, assessed neuromarketing and its dimensions of cognition-attention, memory and emotion, which were validated by experts (V-Aiken = 0.94) and demonstrated high reliability (α = 0.829). The second part investigated the purchase decision and its stages and showed high validity (V-Aiken = 0.97) and reliability (α = 0.907). These results validate the consistency and applicability of the instrument to measure the variables of interest in the study.

The analysis of the data collected was performed using descriptive and inferential statistics (Hernández et al., 2018). Frequency distributions were obtained, and the bivariate normality test was applied using Royston's test and Spearman's Rho to determine the existence, direction and strength of correlation between variables and dimensions for which RStudio 4.3.2 software was used.

4. Results and Discussion

This study analyzes digital consumers in La Libertad and Lambayeque, highlighting their adoption of e-commerce and providing insights into the Peruvian digital market. It focuses on a predominantly young population, with women (63.1%) having an average age of 25.2 years and men (36.9%) having an average age of 28.7 years; both groups show a wide range of ages. These results suggest the importance of adapting neuromarketing strategies to address this young demographic segment. This aligns with our goal of understanding the demographic profile of virtual consumers in northern Peru, suggesting that neuromarketing strategies might need a differentiated approach that resonates more with this segment.

4.1 Analysis of Neuromarketing Results

The analysis reveals that 77.5% of digital consumers in La Libertad and Lambayeque have a medium-level perception of and response to neuromarketing. Specifically, 78.3% of the participants highlighted memory, suggesting its critical impact on online purchasing decisions. However, 25.5% of the participants reached high levels of cognition attention. This pattern not only suggests a significant influence of these factors on online purchasing decisions but also opens the discussion on the need for constant innovation by brands to maintain consumer attention and interest (Figure 1).

Figure 2 underscores the relevance of digital advertising and emotional resonance in e-commerce. Factors such as design, brand, and color are essential for capturing consumer attention (Figure 2a), while emotions, often stimulated by promotions and celebrities, can trigger impulsive purchases (Figure 2b). Memory plays a crucial role in reinforcing brand recognition through memorable ads (Figure 2c). These findings imply that an effective neuromarketing strategy must integrate these aspects to influence online buying behavior, with an emphasis on creating memorable advertising content and personalized user experiences that generate lasting emotional connections.

A comparison with studies such as Kajla et al. (2023) and Alsharif et al. (2021) illustrates the consonance of our findings with global trends, especially in emphasizing emotional responses and the importance of memory in purchasing decisions. These comparisons highlight the value of our study within the specific Peruvian and Latin American context.

Studies such as those by Zito et al. (2021) and Rabhi et al. (2023) complement our research, showing the centrality of emotions in online purchasing and the development of the neuromarketing field. The inclusion of ethical considerations, as suggested by Diesperova (2023), underscores the need for responsible strategies.

This comparison with the previous literature enriches our understanding of the influence of neuromarketing on online purchases, revealing both concordances and areas for innovation in neuromarketing strategies in Peru and Latin America and emphasizing cultural and emotional

adaptation in marketing tactics.

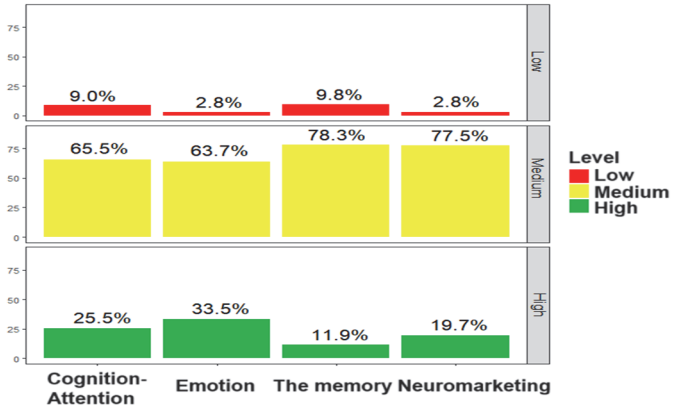

Figure 1. Bars of the percentage distribution of the variable Neuromarketing in virtual stores according to dimensions and level.

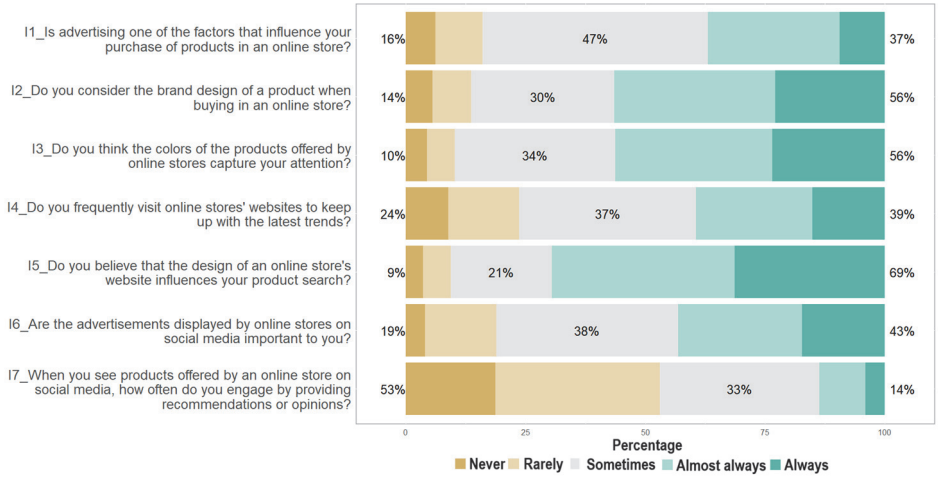

Figure 2. Horizontal stacked bars of the percentage distribution of the dimensions of the variable Neuromarketing in virtual stores, according to the items and frequency of response.
a: Dimension: Cognition-Attention

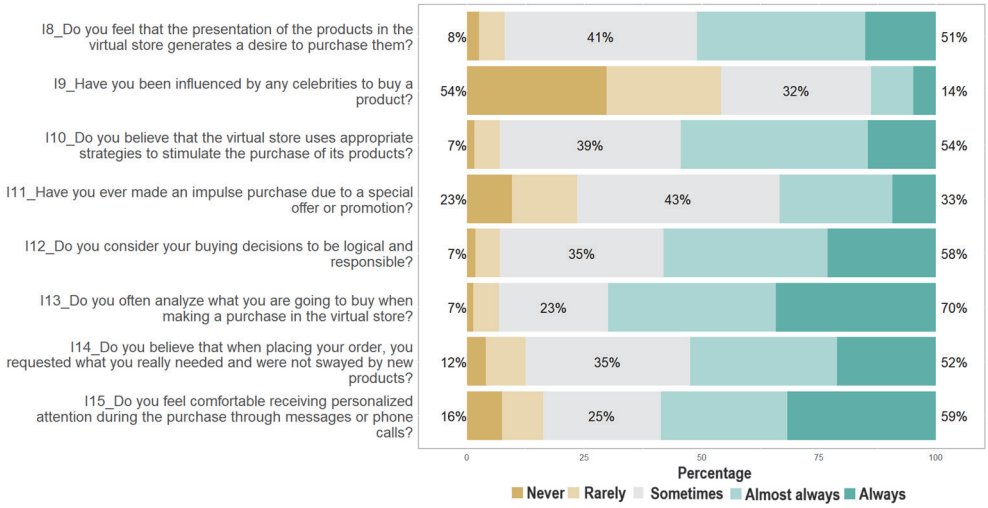

Figure 2.b: Dimension: Emotion

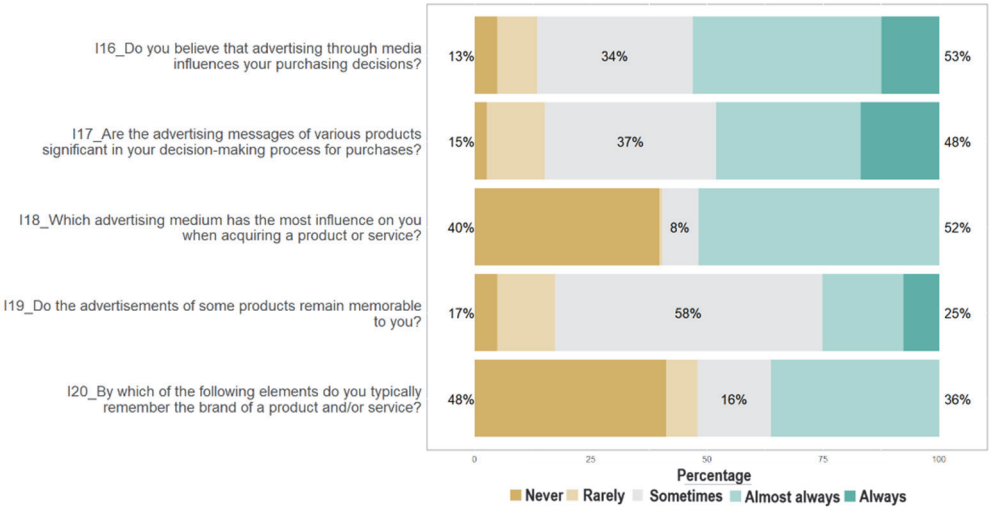

Figure 2.c: Dimension: The memory

4.2 Analysis of purchase decision results

The health crisis accelerated the adoption of virtual channels, pushing companies to adapt their communication and sales strategies to the preferences of increasingly digital audiences. This adaptation is crucial for understanding the mental processes and emotional responses that mediate online purchasing decisions, allowing the creation of distinctive consumption experiences to retain users (Paredes et al., 2021).

The purchasing decision in the virtual stores of La Libertad and Lambayeque shows that 58% of shoppers have a medium level of decision-making, with a marked inclination toward evaluating

alternatives before purchasing (43.6%). This indicates a preference for moderate decisions, emphasizing the importance of providing detailed information and clear options during the purchasing process (Figure 3).

Behavioral analysis reveals the significant influence of advertising and brand on the stages of need recognition and alternative evaluation, highlighting product quality and shopping experience as decisive factors for loyalty. The effectiveness of advertising and postpurchase satisfaction are essential for improving the e-commerce experience, underlining the integration of digital marketing strategies that promote quality and effective communication (Figure 4a-d).

The study's findings regarding moderate online purchasing preferences align with those of Sánchez-Vallejo et al. (2022) on the caution of Latin American consumers to buy during lockdowns. As e-commerce adoption grew, financial resilience in the face of instability limited spending amounts even with intensive advertising. Similarly, Garcés-Giraldo et al. (2022) also show that, beyond generating utilitarian drivers, generating pleasant brand experiences inspires loyalty among millennials. Similarly, Fischer et al. (2022) identify COVID-19 isolation as a catalyst for the first digital purchase, highlighting that postpurchase satisfaction is key to loyalty, along with quality and effective communication. This study underscores the importance of exceeding expectations to retain online consumers postpandemic in Latin America.

Furthermore, memorable stimuli and significant sensory experiences facilitate the recognition of needs associated with the brand. Techniques such as heatmaps, used by Šola et al. (2022), allow the identification of attractive visual elements in advertising, increasing purchase motivation.

Building solid relationships between brands and consumers, focused on customer satisfaction and well-being, is essential in today's dynamic market. Brands use sensory imagery to enrich brand value through marketing innovations and the development of products and services. Understanding consumers from sensory and emotional perspectives is key to designing effective marketing strategies and brand experiences that resonate with their internal motivations (Alizadeh & Kashani, 2022). In this sense, neuromarketing offers a unique window into the brain processes underlying these decisions (Madan, 2010), allowing an understanding of the emotional and subconscious responses that guide the choice of products and services (Morin, 2011).

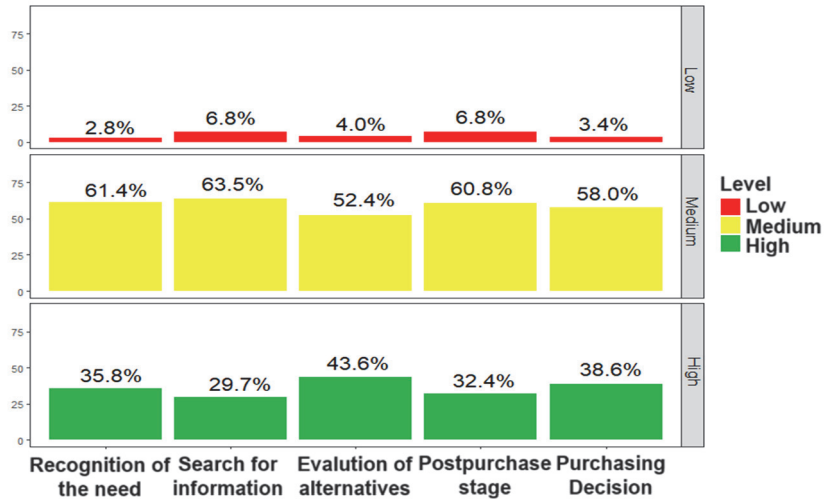

Figure 3: Bars of the percentage distribution of the variable e-commerce purchase decision according to dimensions and level.

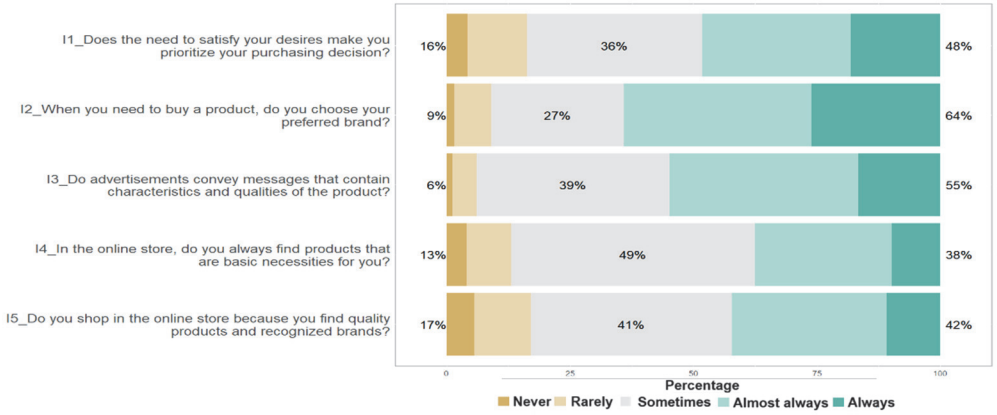

Figure 4: Barras horizontales apiladas de la distribución porcentual de las dimensiones de la variable Decisión de compra en tiendas virtuales, According to ítems y frecuencia de respuesta.
a: Dimension: Recognition of the need

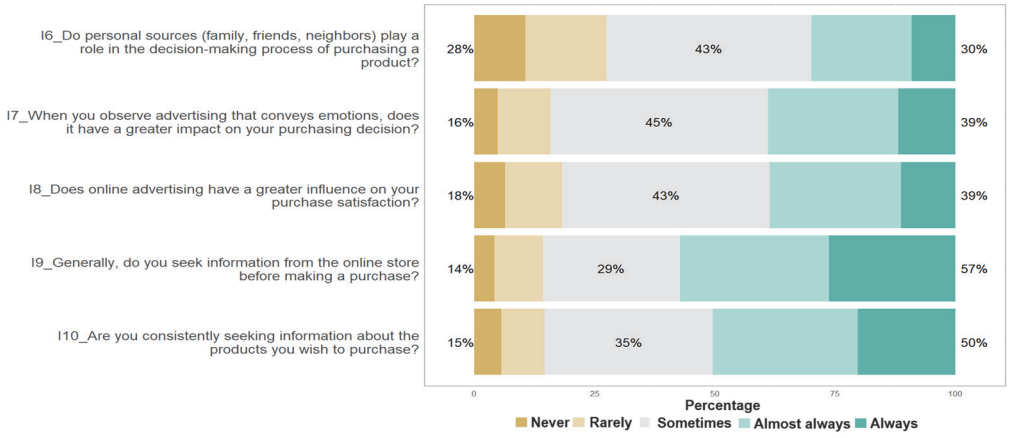

Figure 4.b: Dimension: Search for information

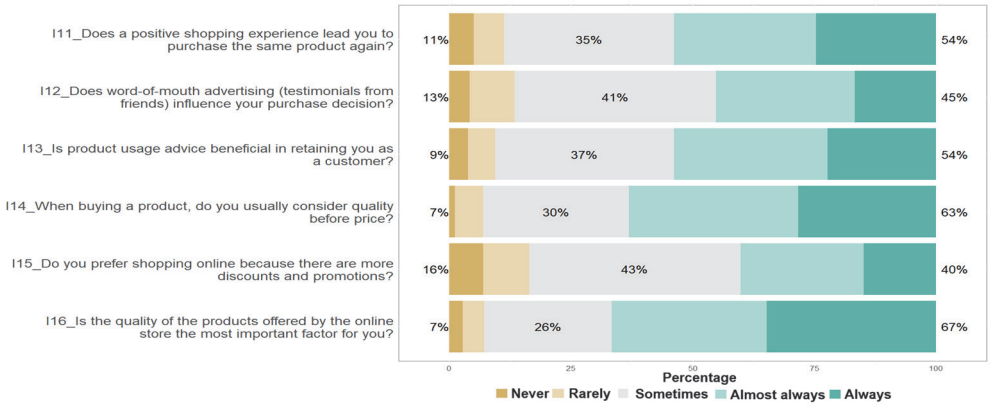

Figure 4.c: Dimension: Evaluation of alternatives

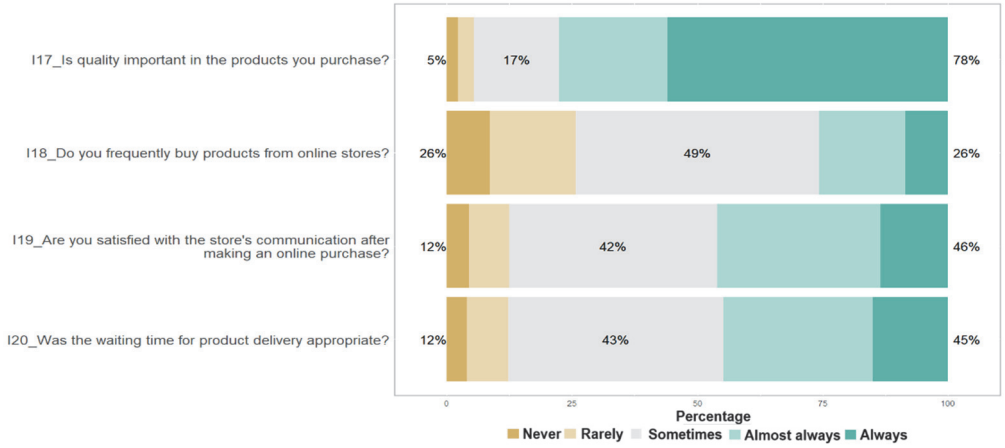

Figure 4.d: Dimension: Postpurchase stage

4.3 Correlation analysis of variables

To determine the relationships between the study variables, Spearman's rho test was applied, revealing significant correlations between the neuromarketing dimensions and postpandemic purchasing decisions in virtual stores. Correlations between cognition attention and information search (rho = 0.58), cognition attention and evaluation of alternatives (rho = 0.53), emotion and postpurchase stage (rho = 0.54), and memory and need recognition (rho = 0.57) are strong. A notable correlation (rho=0.72) indicates the considerable influence of neuromarketing strategies on online purchases, underlining their impact across all purchasing phases.

As Suárez and Rodriguez (2022) warn, neuromarketing tactics demonstrate increasing effectiveness in immersive virtual spaces, successfully connecting with contemporary digital consumers. In this vein, Castro et al. (2022) emphasize the importance of examining subconscious responses using specialized instruments in response to appropriate stimuli. Palomino-Banegas et al. (2022) recognize branding as a key factor in online purchasing and repurchasing, highlighting the importance of neuromarketing in the virtual purchase decision process. This approach demonstrates

its ability to influence Latin American consumer behavior through digital channels, from initiation to postpurchase evaluation, emphasizing the effectiveness of neuromarketing in shaping purchasing behaviors.

In light of the results, the greater the effectiveness of neuromarketing in terms of cognition attention is, the greater the effectiveness of evaluating alternatives in the decision-making process by e-commerce buyers in the northern region of the country postpandemic. Accordingly, previous research has shown that employing sensory stimuli that evoke pleasant emotions intensifies attention/focus processes during the evaluation of products and services by consumers (Brakus et al., 2008; Krishna, 2012). However, in a closer reality and contrary to what has been exposed, Paredes and Cárdenas (2020) showed that there is an inverse and significant correlation between the effectiveness of digital neuromarketing and BTL advertising in shopping centers in the Junín region of Peru during COVID-19, indicating that the greater the effectiveness of neuromarketing is, the lower the effectiveness of BTL advertising. This contrast highlights the need for a deeper understanding of postpandemic digital consumer behavior considering the growing fragmentation of channels and communication support.

It is also observed that there is a significant relationship between the neuromarketing dimension of emotion and the postpurchase stage, meaning that if buyers experience positive emotions for a product or service, the postpurchase stage will be favorable for the company, building associations that drive brand loyalty and fidelity (Serra-Cantallops et al., 2018) and deepening satisfaction after consumption.

Although the research was limited to northern Peru, the evidenced behavioral patterns are consistent with general trends of an increase in e-commerce among Latin American consumers due to behavioral changes driven by the pandemic. In this sense, insights into the applied effectiveness of neuromarketing strategies will allow for greater exploitation of post-COVID-19 regional online market growth potential.

Table 1: Spearman correlation test of the variable Neuromarketing and Purchase decision and dimensions in postpandemic e-commerce.

Dimension of the variable Neuromarketing	**Dimension of the variable Purchase decision**	**n**	**rho**	**IC 95%**	**p-valor***	**r(TE)**
Cognition-Attention	Information search	498	0.58	[0.52;0.64]	0.000	0.41
	Evaluation of alternatives	498	0.53	[0.46;0.59]	0.000	0.35
Emotion	Postpurchase stage	498	0.54	[0.47;0.60]	0.000	0,37
Memory	Recognition of the need	498	0.57	[0.48;0.66]	0.000	0.39
Variable	Variable	**n**	**rho**	**IC 95%**	**p-valor***	
Neuromarketing	Purchase decision	498	0.72	[0.67;0.76]	0.000	0.60

Note: The bivariate correlation of the variables Neuromarketing and Purchase decision and dimensions was checked for noncompliance with the Royston test.

* The correlation is significant at the 0.01 level (bilateral).

The findings of this study highlight the relevance of adapting neuromarketing strategies to enrich the postpandemic online shopping experience, urging marketing professionals to develop campaigns that not only capture attention but also evoke positive emotions and create lasting memories. An illustrative example is the use of augmented reality by tech brands to allow consumers to visualize products in their own spaces, which has been shown to increase interaction and significantly boost conversion rates. This approach emphasizes the potential of immersive and personalized shopping experiences. However, it is imperative to consider ethical implications, such as data privacy and informed consent, to promote a balance between marketing effectiveness and respect for consumer autonomy. Future research should focus on identifying clear ethical practices for the implementation of neuromarketing technologies, ensuring that strategies strengthen brand–consumer connections

without compromising ethical integrity.

5. Conclusions

This study demonstrated a significant influence of neuromarketing, particularly in the dimensions of cognition-attention, memory, and emotions, on purchasing decisions through virtual channels in the postpandemic context. It was found that digital marketing strategies generating brand recall through sensory stimuli and pleasurable experiences linked to positive memories have a greater capacity to activate the recognition of online needs. The levels of attention and cognitive focus in the active search for product information on digital platforms are enhanced by the effectiveness of neuromarketing elements. Moreover, the emotional responses of virtual consumers, especially in terms of postpurchase satisfaction, repurchase evaluations, and loyalty, are closely linked to experiential marketing strategies and the affective ties created by brands. In conclusion, neuromarketing is an essential tool for understanding and directing the behaviors of postpandemic digital consumers, facilitating the creation of memorable experiences and deep emotional connections that will be decisive in the dynamic Latin American online market.

6. Research Ethics

The study was completely anonymous, and no personal data were requested; therefore, no ethical approval was needed, and the participants provided their consent to participate in the study. The authors of the article declare that there are no conflicts of interest related to this article. The application of the study was financed by the Universidad César Vallejo.

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