

Neuromarketing: Evaluating Consumer Emotions and Preferences to Improve Business Marketing Management

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Abstract: The invention of neuroscience has benefited medical practitioners and businesses in improving their management and leadership. Neuromarketing, a field that combines neuroscience and marketing, helps businesses understand consumer behaviour and how they respond to advertising stimuli. This study aims to investigate the consumer purchase intention and preferences to improve the marketing management of the brand, based on neuroscientific tools such as emotional arousal using Galvanic Skin Response (GSR) sensors, eye-tracking, and emotion analysis through facial expressions classification. The stimuli for the experiment are two advertisement videos from the Macau tea brand “Guanding Teahouse” followed by a survey. The experiment was conducted on 40 participants. 76.2% of participants that chose the same product in the first survey responded with the same choice of products in the second survey. The GSR peaks in video ad 1 measured a total of 60. On the other hand, video ad 2 counted a total of 55 GSR peaks. The emotions in ad1 and ad2 have similar responses, with an attention percentage of 76%. The results showed that ad1 has a higher engagement time of 11.1% and ad2 has 9.6%, but only 19 of the respondent’s conducted engagement in video ad1, and 31 showed engagement in video ad2. The results demonstrated that although ad 1 has higher engagement rates, the respondents are more attracted to video ad 2. Therefore, ad2 has better marketing power than ad 1. Overall, this study bridges the gap of no previous research on measuring tea brand advertisements with the neuroscientific method. The results provide valuable insights for marketers to develop better advertisements and marketing campaigns and understand consumer preferences by personalising and targeting advertisements based on consumers' emotional responses and behaviour of consumers' purchase intentions. Future research could explore advertisements targeting different demographics.

Keywords: Neuromarketing, Consumer behaviour, Marketing management, Galvanic skin response, Facial Expression classification

1. Introduction

Marketing is essential for every business, contributing to the company's success. The simplest definition of marketing is "engaging customers and managing profitable customer relationships" (Kotler and Armstrong, 2018, p.28). Marketers must understand the customer's purchase intention to develop a better advertisement and marketing campaign to attract their target customers. As the core value of marketing satisfies customer needs, it is defined generally as a social and managerial process by which individuals and organisations obtain what they need and want through creating and exchanging value with others (Kotler and Armstrong, 2018). The definition is further introduced as the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society (AMA, 2017). To address this theory in practice, customers today are also creators of the brand, and creativity in the marketing industry is the main component of diversifying with competitors by involving customers' interest in their marketing campaigns (Bonchek and France, 2017). Accordingly, in today's digital world, businesses must target digital approaches to reach and engage customers online. Marketing 4.0 stated that moving from traditional marketing to digital marketing, value co-creation is critical in new product development, which allows customers the power to customise and personalise products and services to create superior value propositions (Kotler, Setiawan and Kartajaya, 2016). This paper uses the neuromarketing technique on Macau tea brand “Guanding Teahouse” advertisements to offer an empirical approach to social media advertisements' purchase intention and consumer behaviour. No previous study has investigated tea brand advertisements with the neuroscientific method. Therefore, this study contributes to this growing area of research by exploring the consumer's social media purchase intention and consumer behaviour to improve the brand's marketing management process. The overall structure of the study takes the form of five parts, including - literature review which discusses previous literatures on marketing, consumer purchase intention, consumer emotions and engagements, and neuromarketing; following with a methodology presenting the data and sample collection and experiment design; and the findings and discussions to address the results. Accordingly, the following research question is proposed:

RQ: How can neuromarketing help marketers to improve marketing management?

2. Literature Review

2.1 Consumer Purchase Intention

Consumer purchase intention refers to the consumer's willingness and intention to buy a particular product or service. It is crucial in predicting consumer behaviour and demand for new products (Chaiinkam et al., 2019). Consumer purchase intention is a multifaceted concept encompassing various values, including financial, functional, individual, and social (Chaiinkam et al., 2019). Moreover, consumer purchase intention is a subjective probability of buying behaviour formed through the cognitive process of product evaluation, influenced by external stimuli and conditions (He and Qu, 2018).

2.2 Emotion and Purchase Intention

Emotion plays a crucial role in shaping consumer purchase intention. Research has shown that emotions influence consumers' attitudes towards products or services and significantly impact their purchase intention (Anderlová and Pšurný, 2020). Emotions can be positive and negative and vary in intensity, influencing the consumer's decision-making process. Positive emotions, such as happiness, excitement, and trust, can increase purchase intention by creating a favourable attitude towards the advertised product or service (Fredrickson, 2001).

On the other hand, negative emotions, such as anger, fear, or disgust, can significantly decrease purchase intention as they create a negative attitude towards the product or service (Son, Nam and Diddi, 2022). Furthermore, emotions can mediate between other factors, such as perceived value and purchase intention. For example, research found that purchase intention positively correlates with trust, emotion and perceived value (Yang and Yin, 2018; Wang et al., 2019). Specifically, consumers' perception of the value they will gain from a product or service influences their purchase intention (Yang and Yin, 2018). Consumers evaluate a purchase's potential benefits and sacrifices and determine if it aligns with their needs and desires (Scridon et al., 2019).

Consumers' emotions can significantly impact their evaluation of a brand or product before purchasing (Junejo et al., 2022). They can influence how consumers perceive the value of a product, as positive emotions are associated with higher perceived value, and negative emotions are associated with lower perceived value. Moreover, emotions can drive consumers' satisfaction with their purchase and their likelihood of repurchasing the product or service (He et al., 2021).

2.3 Brand Marketing Management

Marketing management is a companywide taking which drives the company's vision, mission, and strategic planning within all the departments (Kotler et al., 2009). It is a process of planning, executing, and tracking an organisation's marketing strategy. This includes the marketing plan, campaigns and tactics used to create and meet the demand of target customers to drive profitability. Knowing the customers is the first step to developing a successful marketing strategy. Marketers should research the market demographics, needs, trends, and growth to create a sample persona in their target markets (Kotler et al., 2009).

Moreover, previous literature has defined marketing concepts at an organisation level. Figure 1 demonstrates the concepts of marketing defined by the level of social aggregation. The nature of marketing is perceived from three perspectives – The organisational system, the distribution system, and the social system (Sweeney, 1972). The Organisational system focuses on the extension, refinement and evaluation of technology; The distribution system focuses on the functions being performed by the system; And the social system focuses on the determinants, structure and performance of the process to perform exchange (Sweeney, 1972). According to Shee and Abratt (1989), businesses should build corporate image management by projecting the corporate personality in its identity. Therefore, it results from a positive corporate image from effective and successful marketing management of the brand.

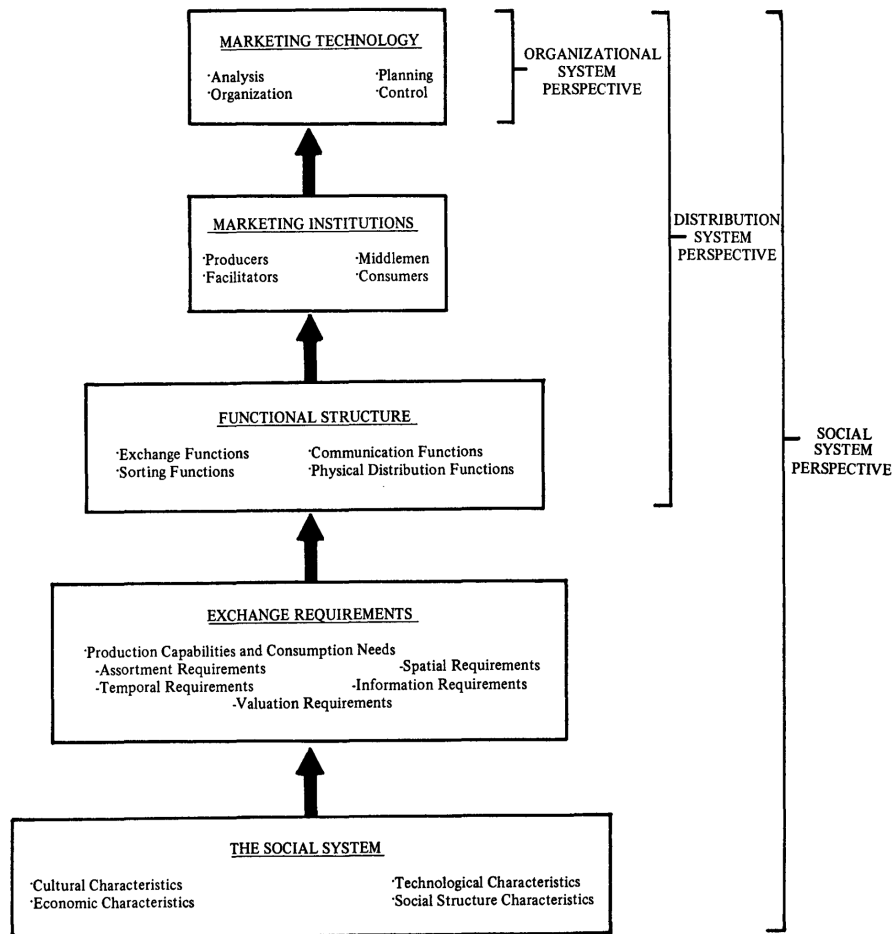


Figure 1: Perspectives on marketing defined by levels of social aggregation (Sweeney, 1972)

2.4 Customer Value and Engagement

Customer value is recognised as the core of the Business Model Canvas, which is the rationale of how an organisation creates, delivers, and captures value (Osterwalder and Pigneur, 2010). Moreover, customer value has also been a key determinant of customers' decision-making and evaluative judgments (Gallarza, Gil-Saura and Holbrook, 2011). Previous research has stated that customer value also influenced pre-purchase and post-purchase significance (Sweeney, Soutar and Johnson, 1999; Kleijnen, de Ruyter and Wetzels, 2007; Leroi-Werelds et al., 2014; Willems, Leroi-Werelds and Swinnen, 2016). Furthermore, Kotler and Armstrong (2018) demonstrated a five-step marketing process for creating and capturing customer value – understanding customer needs and wants; designing a customer value-drive marketing strategy; constructing an integrated marketing program that delivers superior value; engaging and building relationships with customers; and capturing value from customers to create profits and customer equity. Figure 2 illustrates a value co-creation model, demonstrating the provider (the firm) and customer sphere. In the joint sphere, resources integrate with the firm and the customer, consisting of skills and resources to co-create value (Grönroos and Voima, 2013; Leroi-Werelds et al., 2017). Indeed, co-creation involves customers and service companies collaborating to create service value and deliver desired customer experiences (Prahalad and Ramaswamy, 2004). Customer value co-creation behaviour refers to customers actively participating in the value-creation process through their involvement and citizenship behaviours (Yi and Gong, 2013; Shamim, Ghazali and Albinsson, 2016).

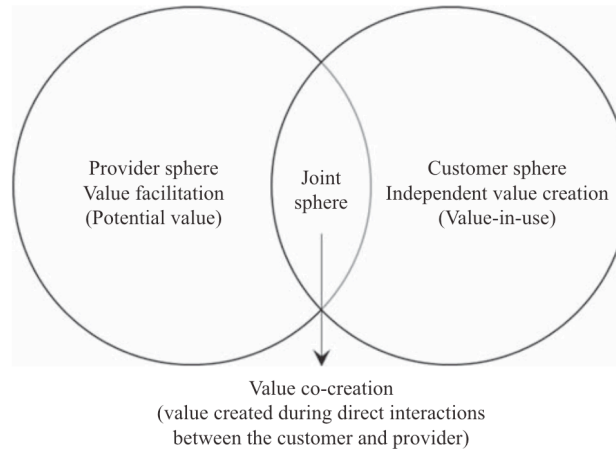


Figure 2: Value co-creation model (Grönroos and Voima, 2013)

On the other hand, customer engagement refers to the psychological state of customers when participating in the service experience interaction process (Brodie et al., 2011). It refers to how customers treat the service company and its personnel (So, King and Sparks, 2014). In addition, customer engagement promotes customer value co-creation behaviours (Merrilees, 2016; Zhang et al., 2017). Additionally, it is demonstrated as a multifaceted concept encompassing aspects of affection, cognition, and behaviour (Hollebeek, 2011). Moreover, it is described as customers' profound dedication and enthusiasm towards building relationships with a company. This is distinct from customer involvement, which centres on customers' interest in specific products or services (Abdul-Ghani, Hyde and Marshall, 2011). Furthermore, customer engagement can result in various forms of customer value, such as customer lifetime value, referral value, influencer value, and knowledge value, which are advantageous for companies (Kumar et al., 2010).

2.5 The Role of Consumer Emotions in Technological Shifts of Marketing

Customer emotion plays a great role in maintaining brand loyalty and providing customer experience. The appraisal theory of emotions defines what circumstances specific emotion induces (Roseman, 1991). In addition, the Mehrabian-Russell model, as shown in Figure 3, demonstrates external environmental factors that stimulate the customer's emotional status, including pleasure and arousal (Mehrabian and Russell, 1974).

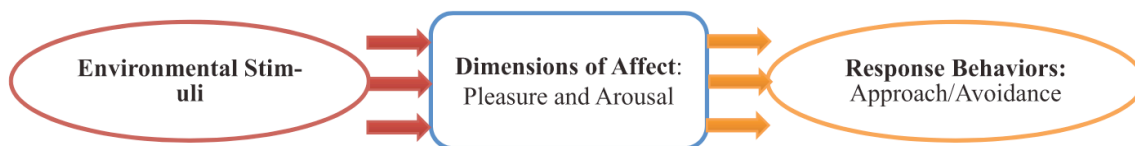


Figure 3: The Mehrabian-Russell model (Mehrabian and Russell, 1974)

Moreover, when customers have high satisfaction, it contributes to positive emotions; On the other hand, high customer expectations can result in negative emotions when the services are not delivered as expected (Price, Arnould and Deibler, 1995; Wood and Moreau, 2006). Hence, customer expectations and emotions are closely related (Haber, 1958). In recent research on customer emotions and experience, neuroscientific tools are used to measure the data better. For example, Verhulst et al. (2020) used electroencephalography (EEG) and galvanic skin response (GSR) to measure emotions in research about the dynamic nature of emotions during the customer experience. It is considered an emotional connection with a brand when customers' motivations and desires are fulfilled unconsciously (Magids, Zorfafas and Leemon, 2015). Opportunities for growth driven by emotional connection can be found throughout the customer experience, extending beyond conventional brand positioning and advertising. Social media, for instance, can play a significant role in fostering emotional connections. A condiments brand, for instance, discovered that a substantial 60% of its customers who were affiliated with social networks (particularly followers on Facebook, Twitter, and Pinterest) displayed emotional connection, compared to only 21% of its overall customer base. By prioritising its social media presence, fostering an online customer community, and directing customers to its website for recipes and promotions, the brand experienced accelerated growth within a few months (Magids, Zorfafas and Leemon, 2015).

2.6 Neuromarketing and Advertising Development

95% of people's decisions are subconscious, and only 5% are made consciously (Zaltman, 2003; Arendonk, Polderman and Smit, 2013). Indeed, traditional marketing tools only tried to understand the 5%, but neuromarketing tools can define 95% of people's decisions (Fisher, Chin and Klitzman, 2010). In the past, neuroscientific tools are expensive and time-consuming to use. Nevertheless, the technology advancement has allowed researchers to use it cheaper and faster than other marketing research methods. It can also provide marketers with information that cannot be obtained through conventional marketing research (Ariely and Berns, 2010). McClure et al. (2004) conducted one famous research on neuromarketing by experimenting with Pepsi and Coca-Cola to participants while undergoing brain scans using fMRI technology. Despite the nearly identical chemical composition of both beverages, individuals often exhibit strong subjective preferences for one over the other. McClure et al. (2004) conducted two tests: a blind test and a test where participants were aware of the drink they were consuming. The results varied between the two tests. In the blind test, most participants preferred Pepsi, whereas most participants favoured Coca-Cola in the test where they were aware of the drink.

Neuromarketing includes all behaviour research and behaviour-based strategies (Dooley, 2011). It uses biometric tools such as eye-tracking, Galvanic Skin Response (GSR) sensors, electroencephalography (EEG), and emotion analysis through facial expressions classification. The human brain possesses hidden information regarding genuine preferences, which can be leveraged to shape consumer behaviour. This potential outweighs the associated costs of employing neuromarketing tools (Hubert and Kenning, 2008; Ariely and Berns, 2010). Researchers have used neuromarketing to study online social media marketing to gain insight into consumers' preferences (Wang and Doong, 2017; Constantinescu et al., 2019), using tools like neurophysiological and biological processes to study the decision-making behaviour of different brands and labels (Meyerding and Mehlhose, 2020). By conducting neuromarketing studies within the realm of social media, companies can obtain valuable insights into how their communication endeavours are perceived by viewers in various aspects, including emotional engagement, memory retention, purchase intention, novelty, awareness, and attention (Sebastian, 2014).

3. Methodologies

3.1 Sampling

Convenient sampling was employed as the sampling method for this study, allowing for the efficient and prompt recruitment of available participants. The experiment consisted of 40 participants, aged between 21 and 49, comprising 22 males and 18 females. The gender distribution is illustrated in Figure 5, with males accounting for a larger proportion of 55%, while females represented 45% of the total participants. In addition, the sample was collected between December 2021 to November 2022.

The experiment occurred at the Laboratory of Applied Neuroscience in the FBL office. Prior to the experiment, each participant received informed consent. All participants were right-handed, possessed normal or corrected-to-normal vision, and had no psychological disorders.

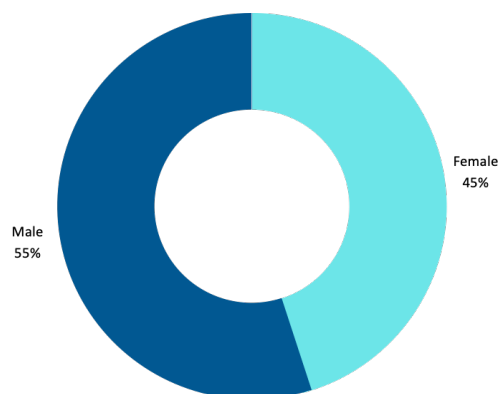


Figure 3: Proportion of Male and Female participants.

3.2 Data Collection Method

The data collection process involved using neuroscientific tools, specifically eye-tracking (Tobii Pro Nano) and galvanic skin response (Shimmer GSR B2F7) with the iMotions software. These tools enabled the measurement

of participants' emotional responses and visual attention when exposed to the marketing stimuli in the project. The experiment was conducted using iMotions software version 8.2 on a 12-inch display of a Dell Laptop equipped with an i7 processor, 16GB RAM, and a GPU and running on the Microsoft Windows 10 operating system.

The collected data encompassed gaze and fixation results from designated Areas of Interest (AOI), heart rate measurements, Affectiva AFFDEX for facial analysis, and FEA (emotions). Electrodes were placed on the left wrist and the distal phalanx of the index and middle fingers of the participant's non-dominant hand to capture heart rate and galvanic skin response (GSR) data, respectively..

3.3 Stimuli Selection

The stimuli are divided into two parts – Video 1 and Video 2, each consisting of a set of Instagram stories (see Table 1). The stimuli are designed to capture the attention of the participant's area of interest (AOI) when reacting to different ads and investigating their consumer behaviour.

Table 1: Stimuli Description for Experiment

Instagram Ads	Descriptions	Type of Ad	Duration
Marketing Model for Video 1			
Video 1	Step-to-step tea tutorial using the tea filter	Video	53s
Instagram Stories Ad 1	Instagram Story featuring the Narcissus Tea Giftbox	Photo	6s
Instagram Stories Ad 2	Instagram Story featuring Cassia tea with the tagline "+10 MOP get a tea filter with any purchase."	Photo	6s
Instagram Stories Ad 3	Instagram Story Featuring the Big Red Robe Tea	Photo	6s
Survey 1	A survey to ask the participants which tea they would like to try	Survey	N/A
Marketing Model for Video 2			
Video 2	Valentine's Day-themed video showing the model and the Big Red Robe Giftbox	Video	42s
Instagram Stories Ad 1	Instagram Story Featuring Oolong Tea Set with price	Photo	6s
Instagram Stories Ad 2	Instagram Story Describing the benefits of oolong tea	Photo	6s
Instagram Stories Ad 3	Instagram Story featuring Big Red Robe Giftbox with price	Photo	6s
Survey 2	A survey to ask the participants which tea set they would like to buy as a gift	Survey	N/A
Ending Ad	An Instagram story featuring the brand slogan "Enjoy a nice cup of tea."	Photo	6s

3.4 Stimuli Strategy

As depicted in Table 1, each stimulus was carefully crafted to elicit specific reactions from the participants towards different advertisements. Video 1 primarily focused on showcasing the products and providing a tutorial on tea consumption. Additionally, three targeted Instagram stories were employed for each product, aiming to enhance comprehension of the product and increase brand awareness. A subsequent survey measured participants' level of interest in each tea after viewing Video 1 and the accompanying Instagram stories.

On the other hand, Video 2 employed a themed promotion centred around Valentine's Day, intending to evoke positive emotions and stimulate purchase intention. The advertisement featured a model's face to gauge audience attention towards the product. 3 Instagram stories followed this. To assess the appeal of the ads, the survey offered participants a choice between an oolong tea set or a big red robe gift box.

Towards the experiment's conclusion, an Instagram story incorporating the brand slogan was employed to elevate brand awareness for Guanding Teahouse further.

3.5 Data Analysis Method

The data is analysed in the iMotions software. GSR peaks, emotions variables and engagement time are selected to measure the advertisement's effectiveness. GSR peaks provide information about emotional arousal in response to stimuli. Using GSR peaks, studies of emotional arousal can include quantitative data and engagement time and measure the rate of emotion that can attract participants.

4. Findings and Discussions (Include reviewed literature)

This research uses neuroscientific tools to measure customers' emotions to gain insight into customers' true preferences. The results demonstrated in Table 2 show that Video 1 registered 60 GSR peaks, while Video 2 recorded 55 GSR peaks, as indicated by the data. Both advertisements elicited similar emotional responses, with an attention percentage of 76%. The findings revealed that Video 1 had a higher engagement time of 11.1%, whereas Video 2 had a slightly less engagement time of 9.6%. However, it is noteworthy that only 19 respondents demonstrated engagement with video 1, whereas 31 respondents exhibited engagement with video 2. These results indicate that although Video 1 showed higher engagement rates, respondents were more attracted to Video 2. Consequently, Video 2 possesses stronger marketing efficacy compared to Video 1. Moreover, 76% of the participants that chose the same product in the first survey also responded with the same choice of products in the second survey.

Table 2: Experimental results of the social media advertisements

	GSR Peaks	Emotion	Engagement Time	No. of Participants Engaged (Engagement Rate)
Video 1	60	76%	11.1%	19
Video 2	55	76%	9.6%	31

The results show that customers are attracted to advertisements with human features. The engagement rate of Video 2 has demonstrated that an advertisement with the model can attract more emotional responses and result in engagement. It is proposed that engagement rate related to emotion response. For which previous studies shown that higher engagement rate contributes to building relationships with customers, and emotion arousal can increase consumer's purchase intention (Abdul-Ghani, Hyde and Marshall, 2011; He et al., 2021). The relationship between GSR peaks and emotion cannot be defined in the study because the GSR peaks in both Videos are similar. Moreover, the continued choices of 76.2% of participants indicated that Neuroscientific tools are effective marketing research tools, and small samples can be accurate and representative of results.

5. Conclusions

Marketing Management is crucial to each brand. This paper aims to find consumers' purchase intention and preferences to improve the marketing management for brands. Emotion, GSR peaks and engagement time are the main influencers for advertising. This research used the stimuli of the tea brand to test the advertising effectiveness on the social media platform – Instagram. To answer the research question:

RQ: How can neuromarketing help marketers to improve marketing management?

The relationship between emotion and engagement time has shown that emotional stimulation in advertisements can increase the engagement of the ad. Moreover, showing human features can increase emotion and engagement. Therefore, it is advised to use human features to improve the emotion and engagement rate of the ads.

This research fills the gap of prior studies that have not employed neuroscientific methods to measure the effectiveness of tea brand advertisements. The findings offer valuable knowledge for marketers to enhance their advertisements and marketing campaigns and gain a deeper understanding of consumer preferences. Marketers can personalise and target their efforts more effectively by tailoring and aiming advertisements at consumers' emotional responses and purchasing intentions. Subsequent studies could investigate advertisements targeting diverse demographic groups. There are several limitations for this research. First, the samples are convenient sampling which did not have a balance age range. Second, the stimuli are not highly

differentiated from each other, future research should use a more diverse set of stimuli for a more significant result of GSR peaks and emotions. As stated in previous literatures, 95% of people's decisions are made subconsciously, future study should consider research on effects of human features on emotions and purchase decision.

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