



A Systematic Review and Analysis of Marketing Factors and Stimuli on Consumer Purchasing Behavior

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Author Note

There are no known conflicts of interest to disclose.
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Abstract

Background—Amidst the ever-increasing economic affluence of the 21st century, consumer buying behavior is at an all time high. Consumer buying behavior explains the innate biases, preferences, and motivations that influence purchasing patterns.

Objective—This paper aims to review the literature investigating the influence of neurological and psychological factors on consumer buying behavior.

Methods—To find all relevant studies, a systematic search of PubMed was employed. Search terms included “consumer behavior,” “purchase decision,” and “neuromarketing.” Only clinical trials and randomized control trials with full-text access were used, except for the term neuromarketing, where no filters were applied due to a lack of results.

Results— Both internal (psychological, demographic, emotional, neurological, physiological) and external (pricing, cultural, advertising, and branding) factors influence consumer purchasing behavior in positive or negative directions. Some examples of psychological factors are group conformity and color psychology, which influence consumer decisions by heightening brand appeal and brand association. Sociological and cultural factors include demographics, which discuss consumers’ preferences and needs according to age, race, gender and economic status. Economic factors stem from individual income and public economic trends that influence consumers’ prioritizations and preferences for normal, inferior, substitute, and luxury goods. Neurological and physiological factors account for conscious and unconscious decision making. Unconscious decision making takes into account brain hemisphere activity and hormone excretion based on stress, sleep, hunger, and numerous other factors. Lastly, branding factors include all external decisions made by companies to influence the decision-making processes of consumers, such as pricing, advertising, packaging, and branding.

Conclusions—Overall, the majority of the literature found that neurological and physiological factors surrounding consumer purchasing patterns influence and are more susceptible to corporate influence on consumer buying behavior than external demographic, cultural, and economic factors. It is important to dissect the roots of consumer buying behavior in order to better understand consumer cognitive biases and preferences, and better allocate resources and information toward society, especially of underprivileged and minority communities. Public and private sectors should look at the results presented in this study and marketing model to create a more effective marketing plan toward their target consumers.

Introduction

Review of the Problem

With the rise of businesses, media, and consumer population, it is vital for companies to understand effective methods to target consumers. However, marketing has often developed a blind spot for underrepresented marginalized (URM) populations who may not have access to products nor feel represented in advertisements. Therefore, in order for businesses to extend their message to their largest audience in an efficient manner, it is important to consider factors of consumer purchasing behavior for all populations. Identifying external and biological drivers of consumer purchasing behavior can provide for more effective and cost-efficient strategies to target consumers. Recognizing consumer preferences and relaying brand messages to consumer preferences is a dual priority. In summary, creating interventions to influence consumer behavior may help to facilitate greater attachments and purchasing of brands from consumers, and, ultimately, extend accessibility of products to consumers who may need them most. The aim of this review is to identify the effectiveness of advertising and branding factors on consumer behavior, which may help to identify factors most valued by consumers, consumers most vulnerable to purchasing influence, and the responses of overlooked populations, in order to monitor the relationship between brand intervention and consumer purchasing.

Understanding Consumer Behavior

Consumer behavior is a field of marketing research studying consumers' preferences and decision-making, and the emotional, psychological, and cognitive factors that influence decisions. Consumer purchasing behavior is the factors and marketing stimuli that influence consumers' purchase intention, willingness-to-pay (WTP), and purchase decision-making. According to Camarrone et al., brands are defined as a mental construct that allows consumers to distinguish product attributes; brands are responsible for differentiating their products to appeal to consumers and cultivate brand identity (Camarrone et al., 2019). Purchasing behavior is determined to consist of numerous internal and external factors that supply consumer expectations, and is measured by both traditional (physiological) and innovative (neuroscientific) research methods.

Understanding Neuromarketing

Neuromarketing is a cost-effective method to measure consumer emotions and cognitive behavior without confronting response and self-assessment biases. Neuromarketing is a research field which studies consumers' emotional responses to marketing stimuli. It incorporates imaging technologies, such as commonly used functional magnetic resonance imaging (fMRI), electroencephalogram (EEG), Functional near-infrared spectroscopy (fNIRS), eye tracking, and physiological signal measures (Chew et al., 2016) to provide quantitative tracking of consumers' emotion, motivation, attention, memory, and other cognitive measures that traditional research methodologies fail to measure. EEG, a common asset used in neuromarketing, measures brain activity from a subject's scalp through the use of a brain-computer interface (BCI) (Chew et al., 2016). It has been used to track emotional

responses and predict accuracy of expressions for many stimuli, including forecasted music streams, (Leeuwis et al., 2021), responses to automotive websites (Mauri et al., 2021), and response to television advertisements (Morillo et al., 2016). Functional near-infrared spectroscopy (fNIRS) is another non-invasive neuroimaging tool to measure the cerebral hemodynamic responses (Qing et al., 2021) – used to decode preference levels for advertising, beverage brands (Qing et al., 2021), implicit awareness, (Fu et al., 2022) and avoidance and acceptance of marketing strategy (Duan et al., 2021). Due to the surge of neuromarketing applications, many successful companies have incorporated neuromarketing techniques to further dissect consumer motivations, appeal to targeted audiences, and extend their brand messages to large audiences in order to improve sales and brand awareness.

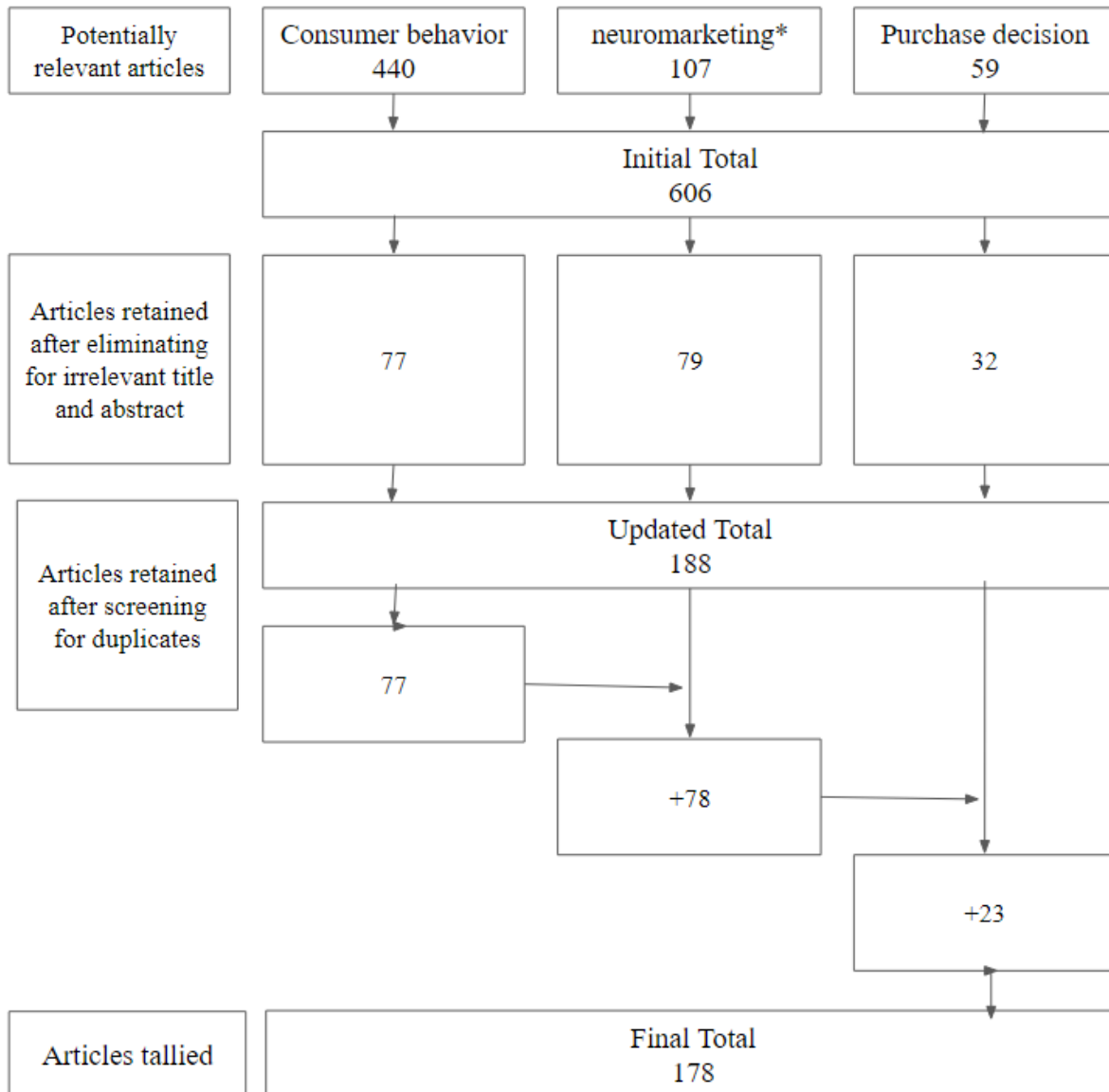
Methods

Search for Publications

The search for relevant literature was conducted in PubMed, using the search terms “consumer behavior,” “purchase decision,” and “neuromarketing.” To narrow and increase relevance of results, the search terms “consumer behavior” and “purchase decision” were limited by the filters “free full-text,” “clinical trial,” and “randomized control trial,” which yielded 440 returns and 59 returns, respectively. Due to the lack of results with filters, the term “neuromarketing” was not limited by filters, and yielded 107 returns. Moreover, the search was narrowed by reviewing the abstracts of each article and eliminating articles that discuss irrelevant fields (non-purchasing behavior), and irrelevant or unoriginal data fields (editorials, magazine articles, review articles). To analyze the data, titles and abstracts were individually reviewed by relevance and disqualified if they met criteria for irrelevant or unoriginal data. Abstracts were reviewed to ensure that factors of consumer buying behavior and its outcomes were mentioned. Duplications of data were eliminated to shorten the results. The last search for relevant articles was conducted September 2022. Out of 606 total articles, 178 were deemed to be relevant for this review.

Figure 1

Flow Chart of Literature Review for the Effects of Marketing Factors on Consumer Purchasing Behavior



Note: Filters applied were free full-text articles, clinical trials, and randomized control articles, except neuromarketing, only free full-text was applied because no articles appeared in search results

Results

Factors of Consumer Behavior

Interventions: Labels, Warnings, Positive v. Negative Information Provided

Consumer preference and purchasing behavior can be influenced by product labels and warnings. However, not all labels can positively influence decision-making. When encouraging consumers to purchase low-energy dense (healthier) products, semi-directive labels such as health-star ratings had the largest influence in consumer perceptions of nutritious quality in

products because the labels were easy to interpret, and an evaluation of the nutritional quality of the food was already made for them (Arellano et al., 2020; Vargas-Meza et al., 2019; Wyse et al., 2021; Acton et al., 2019). Graphical warnings can increase activation in brain regions associated with reward, self-control, and self-regulation in normal BMI individuals (Mehlhose and Risius, 2020) which can influence immediate and long-term consumer decision-making. For instance, Wright and colleagues found that more specific and graphic warning labels heightened negative perceptions and consideration of health consequences in consumers (Wright et al., 2022). In contrast, labels that had less specific or more vague information, such as calorie recommendation benchmarks did not reduce purchasing of higher-calorie products nor reduce calories purchased overall (Kühne et al., 2022; Downs et al., 2013; Donnelly et al., 2018). This may be explained by “averaging bias”, the theory that consumers may inaccurately judge, or evaluate, the combination of two or more products, even when those same products are judged accurately independently. (Kühne et al., 2022). Consistent with the results of Kühne et al. Downs et al., and Donnelly et al., Riesenberget al. found no impact of labeling added sugar content on intended purchases; however, they suggest that labels can be effective when used with other interventions to indirectly influence consumer purchasing (Riesenberget al., 2022). It is important to acknowledge that consumers like simplicity, shown by higher purchasing rates of targeted products with colorful labels easy to read and process (Kühne et al., 2022). Thus, in order to direct consumers to targeted products, labels that are direct and simple to read and understand may be more effective at motivating behavior change (Viera et al., 2017). Interventions that alter the availability of targeted products relay significant effects in consumer purchasing of targeted products. For instance, a study by Kleef et al. displayed a significant increase in healthy snack purchasing when 75% of the assortment consisted of healthy snacks compared to 25%, regardless of display location (Kleef et al., 2012). Furthermore, a study by Marques et al. suggests that nudging interventions increase vegetable consumption and purchasing (Marques et al., 2020). Lastly, tailoring—personalizing the content and information a consumer receives based on characteristics of the consumer—did not exhibit a significant difference in consumer purchasing (Stacey et al., 2021).

Pricing, Taxes, and Subsidies

Regardless of brand values and brand perceptions, price remains a large focus of consumer purchasing behavior. Studies evaluated the effect of price changes, such as taxes, discounts, subsidies, and cost incentives on purchasing behavior. R D Levrini and Dos Santos found conscious price variations as a significant influence of purchase intention. Their study indicated that brand and price indicated to consumers quality and served as heuristic hints (mental shortcut to simplify evaluation of an object or event when individuals are not motivated to process information or when decisions are less important). They found distribution between consumers' profiles: who values quality and attributes, who values low price, and the ones who value a balance between quality and price (R Levrini and Dos Santos, 2021).

Geiber et al., found that when encouraging purchase of low-energy density foods through a discount intervention, consumers were more likely to purchase fruits and vegetables during the intervention, and regression toward the baseline in the follow-up, suggesting that discounts influenced purchases. Interestingly, purchase of low-energy density food remained above the baseline during the follow-up period, which suggests that price discounts can positively influence consumers' long term behavior (Geliebter et al., 2013). A study by Brimblecombe et al. supports these results, suggesting that price discount alone can increase purchases of fruit and

vegetables to an extent (Brimblecombe et al., 2017). Taxes on un-targeted items provide a substitution effect and increase targeted product sales as well (Waterlander et al., 2019). Other methods, such as advertising and consumer education can boost the purchasing influence of price.

Incentives other than price, like rewards, also influence consumer purchasing behavior. For instance, education and disclosures regarding issues, like environment and health-based information influence consumer purchasing decisions. According to Asensio and Delmas, disclosures about environment and health-based treatments motivated energy savings by up to 19% (Asensio and Delmas, 2015). Rewards and impulse, the tendency to choose smaller immediate rewards over larger delayed results were measured in a study by Appelhans et al. The study found that time delays did not harm overall sales, and that a time delay to sales of a regular product increased sales of an alternative. The study remained consistent with delay discounting models, suggesting that rewards provided instantly or delayed influence purchase decisions (Appelhans et al., 2018). Another study measuring effects of episodic future thinking (EFT) in healthful food purchases supported this result, as both goal-directed EFT and general EFT led to purchasing fewer calories (Hollis-Hansen et al., 2018). Lastly, Michels et al., found that cost-incentives and subsidies, as well as education on targeted goods (such as healthier products) influenced purchasing of the targeted goods, during intervention and post-intervention periods (Michels et al., 2008).

Interestingly, demographics played a role in purchasing behavior during the former study, as purchasing of healthy snacks was substantially higher in “white collar” locations than “blue collar” locations in all phases of the study. Other than price itself, socioeconomic, cultural, and behavioral traits could influence purchasing as well.

Non-price factors may explain the variance in results between similar studies. For instance, a study conducted by Seah et al, taxing and subsidizing lower-sugar beverages on vending machines found that neither the tax nor subsidy significantly changed unit sales of high- or lower-sugar beverages as compared to the control condition, suggesting that factors such as resonance value, physiological cravings, and psychological desires for peer acceptance, pleasure, and excitement overrule the influence of price incentives on purchasing behavior (Seah et al., 2018).

Cognitive/Neurological

In recent decades, applications of neuromarketing and neuropsychology in market research have become popular in providing unbiased measurements of physiological, cognitive, and neural signals to predict consumer motivations and purchase decisions. Specifically, analysis of EEG signals of consumers’ purchase intentions and affective attitudes when exposed to advertisements centered on product features, endorsement, or promotions, has shown N200 and N400 components when people tend to make decisions after visualizing static advertisement, which suggests that subjects tend to decide negative affective attitude and negative purchase intentions faster than positive attitudes. Furthermore, there appears to be a negative EEG peak for endorsement advertisements, positive peak for promotional advertisements, and neutrality on product-focused advertisements. (Mashrur et al., 2022).

Furthermore, behavioral and event-related-potential (ERP) measures indicate the influence of emotions on consumers’ price preference and buying behavior. For instance, Ma et al, found that Intense emotional arousal in continuous reward scenarios influence consumers’ price perceptions in purchasing continuous win high-price hard-disk products (Ma et al., 2018).

Furthermore, Goto et al. suggests that early ERPs (such as N200) indicate consumer preferences driven by unconditional and automatic processes, and later ERPs indicate preferences built by conscious cognitive processes. They also found that “wanting” and “pleasantness” of products drove consumer preferences on item categories, as high price items were wanted more than moderate and low-priced items (Goto et al., 2019).

Additionally, EEG-based neuromarketing technologies can assist brands more accurately predict consumer preferences. For example, neural synchronization could predict the popularity and likability of music 3 weeks after release (Leeuwis, et al., 2021).

In addition, consumer willingness to pay is reflected by brain activity. Prefrontal asymmetry in the gamma frequency band is related to consumption behavior and consumer WTP (Willingness to Pay). Frontal asymmetry in the gamma varies by product category, with certain product categories invoking higher asymmetry (and willingness to pay) for the product than others (Ramsøy et al., 2018). Therefore, gamma asymmetry indicates and correlates to consumer purchasing behavior. Prefrontal alpha band asymmetry is related to reward expectancy and decision making (Miller and Tomarken, 2001), and individual traits such as reward sensitivity (Pizzagalli et al., 2005) which also plays into consumer purchasing behavior. Eijlers et al. found that arousal-evoking IAPS pictures prompted decrease in power of the alpha band when comparing high to low arousing stimuli, but attitude toward ads was negatively associated with arousal evoked in response to the ads – which may indicate negative perceptions of brands and advertisements (Eijlers et al., 2020). Lastly, Fu et al., found that a higher activation in the dorsolateral prefrontal cortex (dlPFC) predicted the effectiveness and impact of PSAs on participants and affected their decision-making processes (Fu et al., 2022).

When observing brand association rates, Camarrone and Van Hulle found that nonverbal, mental association of brands is subject to conscious processing, which N400 responses can reveal. They also found that consumers consciously associate brands with different values (Camarrone and Van Hulle, 2019). This observation is meaningful because brand associations can influence consumer decisions and purchasing when retrieval stimuli are presented in commercial messages (Romaniuk and Nenycz-Thiel, 2013). A study by Wästlund et al. indicates that brand association and brand recognition influence consumers’ perceptions, as consumers eliminate non-target products from their peripheral view, which eliminates novel brands almost completely from a consumer’s view (Wästlund et al., 2018).

A study by Belchev et al. reports that brands are able to indirectly influence and change consumer choices through manipulating the context of a product choice (Belchev et al., 2018). This suggests that it is possible for brands to significantly influence consumers’ brand associations. A study by Bryan et al. supports this suggestion, as the study intervention successfully influenced implicit positive association with junk food marketing to reframe dietary choices in consumer purchasing (Bryan et al., 2019).

Raiesdana and Mousakhani found that providing information about the specifications of a particular product through emotional and attentional simulations alters connectivity patterns of brain activity and consumers’ decisions (Raiesdana and Mousakhani, 2022). Furthermore, memory-related processes, such as brand awareness, product experience, and advertising recall, can influence consumers’ behaviors. In a service-to-service brand extension, memory retrieval and comparison of attributes of brands contribute to consumer brand extension and indicate the success of brand extension. Yang and Kim suggest that success of brand extension is reflected in amplification of the left fronto-parietal P300 (Yang and Kim, 2019).

Humans are inherently social. A study by Barraza et al. suggests that brands that oxytocin (a biological substrate of human attachment) helps influence brand perceptions of competence and enhances the use of positive emotional and friend-like language when describing brands (Barraza et al., 2021). Brands may stimulate biological mechanisms in consumers that help them build attachments and relationships to the brand in order to influence consumer perceptions and purchasing of the brand.

Psychology and Sociology

Psychological factors, such as motivation, social ties, desire for peer acceptance, and perceived value of rewards and incentives play a large role in consumer purchasing. Marketing research has found that consumers are more likely to be influenced by strong social ties (such as friends and family) in purchasing than weak social ties (such as strangers and acquaintances). Upon examination of neurocognitive and emotional processing, people were more likely to purchase products recommended by friends, and more likely to avoid purchasing products recommended by strangers (Luan et al., 2017). However, consumers are still subject to influence by weak social ties, as customer service or positive interactions with strangers elicit pleasurable and implicitly positive feelings that influence consumer preferences (Calvert et al., 2019). Furthermore, Madipakkam et al., found that consumers had an increased preference for products purchased or looked at by others (Madiakkam et al., 2019), regardless of social ties.

Positive emotions do not necessarily have to be invoked by social interactions. Resemblances of positive faces, like a watch setting resembling a smiling face can affect the psychological response of consumers to induce pleasurable feelings and intention to buy (Karim et al., 2017).

Furthermore, a psychological evaluation of rewards and losses play an important role in consumer behavior. Winning influences consumer purchasing of higher-status products, and a lower refusal to accept unfair prices (Wu et al., 2017). Wu et al. suggests that winning influences dominant behavior and feelings of entitlement, which may cause consumers to prefer higher-status products, such as prestigious cars (Wu et al., 2017). Interestingly, loss aversion, a psychological idea that losses and risks have a higher psychological impact than benefits, seems to affect this behavior. Studies suggest that age is positively correlated with the change of VS/NAC (a central region for reward and aversion processing), which proposes that older individuals are more likely to avoid potential negative outcomes, rather than pursue gains, or be promotion-focused (Viswanathan et al., 2015).

Attention and motivation stemmed from psychological processes also contributes to approach/avoidance behavior, which further influences purchasing decisions. A systematic relationship between reward/aversion behavior and divided attention exists, a functional model quantifying relationship between signal detection in attention and approach/avoidance behavior found that a more liberal response bias under signal detection correlates with higher levels of loss aversion (Viswanathan et al., 2017).

Lastly, a study by Weibel et al., suggests that completed and intended altruistic and egoistic actions can influence consumer purchasing. According to Weibel et al., recalling altruistic action motivates individuals to purchase less healthy options than egoistic options, but intentions of completing an altruistic action motivates individuals to prefer healthier food options (Weibel et al., 2014). This suggests that less favorable or more favorable actions can influence consumers' self-concept, which in turn influences moral or immoral purchasing choices.

Emotional appeal

Emotional appeal and emotional impact from brands to consumers play an influential role in consumer decision-making. Emotion-based advertising expressing vulnerability increase the amplitude, therefore are more effective in garnering consumer investments (Harris et al., 2019).

Emotional-response to advertising can garner purchases: Zito et al., found that an emotion-based advertisement with the donor more visible increased call-to-action rates in viewers, as well as increased donations to the campaign (Zito et al., 2021). Furthermore, when faced with two different website interface configurations for similar products (TESLA and Ford electric vehicles), consumers extracted more positive values from the TESLA due to the more visual elements, colors, and interactive features of the website, that generated a greater emotional impact (Mauri et al., 2021). Therefore, the emotional impact of brands' communication networks play a large role in influencing brand perceptions and purchases.

Additionally, brands that can elicit values that are differentiated from conventional products and stimulate sensory experiences in consumers induce a greater emotional intensity in consumers, which positively impacts purchase intention. Mengual-Recuerda et al., demonstrate the emotional impact of dishes in Haute cuisine, with special and personalized presentation of dishes on consumers. In this case, dishes with special presentation elicited greater levels of emotional intensity due to the greater aesthetic appeal than conventional dishes. However, the emotional impact fell throughout the experience, highlighting that not all events have the same emotional impact (Mengual-Recuerda et al.,

If successful, brands themselves can elicit emotional response from consumers, which leads to higher purchasing rates. In observing arousal levels from blind to uncovered brand tests, Laureanti et al. found that 44% of subjects changed their preference when the brand was uncovered: from blind to not blind conditions, and arousal levels changed from one brand to another in the blind and not blind conditions (Laureanti et al., 2022). This suggests that branding can affect the first emotional response of consumers and plays a large role in consumer decision making.

Emotional appeal through social media networks can induce positive emotions for consumers, which in turn generate conversions and brand appeal. For instance, Rúa-Hidalgo et al., found that GIFs generate emotionality in consumers through the use of color, movement, and repetition (Rúa-Hidalgo et al., 2019) which contributes to brand loyalty and engagement.

Packaging, Aesthetics, and Branding

Furthermore, many studies support the influences of aesthetic and visual appeals of brands, such as packaging and logos, in brand recognition. Bruce et al., found that food logos elicited increased activation in the posterior cingulate cortex, brain regions associated with motivation and brand recognition (Bruce et al., 2014). As packaging is the first visual element of a product, packaging appealing to the eye, such as transparent packaging (Chandran et al., 2009; Van Ittersum., 2007) increased trust and expected quality in the product, and packaging with reference to territoriality and geography of origin increased perceived product safety and trust in the product, thus positively influencing intention to purchase (Russo et al., 2021).

If done right, product display can help online retailers capture attention and engagement. Consumers in the information seeking and evaluation stages can arrive at product pages designed around a single option, along with recommended products in their peripheral view.

They can decide to purchase based on display items and perceived attractiveness compared to the price of the product, moving forward with “add to cart” or “buy now” options. Product display and configuration of recommended products is important in consumer decision making. Recommended products that mismatch the target product deters attention from target products by displaying unrelated values. Karmarkar et al., found that while attention to the target item remained similar for both matched and mismatched displays, mismatched displays captured more attention away from the target than matched displays. Related products can influence the purchasing of a target product; cohesiveness and display attractiveness during the point of purchase stage play a large role in influencing purchasing behavior (Karmarkar et al., 2021). Consumers make implicit aesthetic preferences, therefore, layouts that elicit emotional arousal can induce consumer attention and preference toward a targeted product (Wang et al., 2021).

Attention is a key factor in advertising, which influences purchase behavior. Increased theta synchronization and alpha desynchronization helps demonstrate attention with episodic memory encoding (Harris et al., 2019). With advertising, videos that are shorter generate greater asymmetry of the regions of interest in the prefrontal cortex (Qing et al., 2021), which suggests that shorter videos can stimulate more attention from consumers, influencing brand recognition and product purchases.

Interestingly, brand perception is shown to vary between genders. Males typically exhibit more targeted preferences for commercial advertising and women exhibit greater rates of spontaneous recall and appreciation when viewing online advertisements (Qing et al., 2021; Guixeres et al., 2017). Therefore, advertising that caters to each demographic is predicted to be most effective in influencing consumers’ brand perceptions.

Advertising

An effective way brands can influence consumer decision-making and purchasing behavior is through advertisements. Although advertisements are typically viewed as increasing consumer preference of brands, certain aspects of advertising have greater influence than others. For instance, video commercials with a narrative structure and greater frequency of branding product exposure positively influence consumers’ preference for showcased products (Wang et al., 2016). Advertisements with visual aids, such as bar charts or tables, can also influence recall accuracy, attitudes, and behavioral intentions of consumers (Sullivan et al., 2015). Advertisements also bring attention to brands, but do not always garner positive consumer perceptions. For instance, advertisements that evoke arousal are positively correlated with notability, but negative evaluations (Eijlers et al., 2020) that may influence consumers’ perceptions of the advertised brand. Use of influencers, especially female, in advertising also seems to garner attention to brands. For instance, the Adidas brand garnered more attention when placed on the sweater neck of an attractive influencer. However, attention to the brand is more delayed by the influencer. For example, a tattoo on a female influencer’s arm received more attention by participants than a brand (Mañas-Viniegra et al., 2020). Thus, brands should raise attention through advertisements, but be wary of distractions and possibly negative perceptions of the brand consumers might face.

It is important to recognize the differences in advertisement reactions between groups. When compared with the neurotypical population, which was found to enjoy complex advertisements, individuals with Aspergers exhibit confusion and displeasure for complicated narratives (Nuñez-Gomez et al., 2020). Therefore, it is important to consider factors that influence different populations of a targeted audience when influencing purchasing behavior.

Overall, the literature suggests that it is important to be strategic in advertising to evoke a positive response from all targeted individuals.

Demographics (gender, age, income) & culture

Demographics, such as gender, age, income, and cultural differences play a role in cognitive behavior and consumer purchasing behavior as well. Vecchiato et al., found that the cerebral variable of interest varies between men and women, and different scenes evoked higher values and emotion between genders (Vecchiato et al., 2014). This finding is significant because it indicates that men and women exhibit interest, engagement, and memorization for different aspects of commercials; therefore, marketers can strategize forms of communication to target demographics in more efficient and engaging manners. Gender differences extend past commercial responses as well, as females tend to exhibit greater refusal toward novel products and culture mixing. Females show a greater refusal for novel food than males based on different communications strategies regarding healthfulness (Russo et al., 2020) which indicate that methods of communication can influence consumers' perception and acceptance of new products and that females and males have different levels of acceptance regarding novel products and their communication strategies.

On a corporate level, Rost et al. suggests that depression product purchasing behavior was greater in smaller companies with greater health benefit risk taking and generosity, whose benefit employees were male. Company cultures with less politicalization of health care benefit decision making were more likely to purchase depression products as well (Rost et al., 2014). This suggests that the demographics, such as employee gender, alongside employees' political culture, and company's general political values, influence corporate investments on a large scale.

Cultural strategy and understanding is important for transnational brand marketing. Demographics of race and ethnicity can influence purchasing decisions as well. Ma et al. evaluated consumers' influence of ethnocentrism (preference of local brands over foreign brands). They found that Chinese subjects preferred logos recommended by individuals of shared ethnicities, exhibited by the lower activation of the N200 region evoked by the in-group recommended logos than the out-group recommended logos (Ma et al., 2019). Females tend to prefer local products at a greater level, as culture mixing evoke perceptions of external threats to in-group identity, which leads to greater emotional responses of disgust in females, as females have greater emotional physiological and neural responses in processing than males (Duan et al., 2021). However, Ma et al. also found that familiarity with foreign cultures reduced influence of consumer ethnocentrism, which may provide a way for international marketers to navigate consumers' cultural preferences and ethnocentrism (Ma et al., 2019).

Factors such as mental or learning disorders can influence perceptions as well. For instance, while providing calorie labels on menus can promote healthy food purchases in neurotypical groups, the same affects those with Anorexia Nerviosa, Bulimia Nerviosa, and binge eating disorder in different ways. Menu labeling may decrease the calories ordered among individuals with Anorexia Nervosa and Bulimia Nervosa, and increase calories ordered among individuals with BED (Haynos and Roberto, 2018). Therefore, it is important for brands to consider effects on all groups of their targeted audience when nudging toward a certain purchasing behavior.

Discussion

The majority of the literature finds a positive relationship between influential factors and purchasing behavior. The current search uncovered 440 studies indicating this relationship. The literature is differentiated between several factors, based on their mode of influence. These include, neuro-cognitive factors, price, disclosures and labeling, psychology, emotional appeal, advertising, and demographics. Studies examining price changes on purchasing behavior often indicated that subsidies on targeted products and taxes or price increases on non-targeted products were more likely to influence consumer purchasing of targeted products.

With disclosures and labeling, the majority of studies found that labels that were easy to spot, read, and understand were more likely to influence consumer decisions and understanding of a brand's message. For instance, Mehlhose and Risius found that graphical warnings can increase activation in brain regions associated with reward, self-control, and self-regulation in individuals to motivate immediate and long-term purchasing of targeted products (Mehlhose and Risius, 2020). However, a small number of studies found that interventions and labeling healthy and unhealthy products encouraged un-intended effects (purchasing of higher calories) (Kühne et al., 2022; Downs et al., 2013) or non-significant effects on purchasing (Riesenberg et al., 2022). The variance in results suggests that it is possible for labeling and interventions to influence consumers in either positive or negative directions. Therefore, brands should account for all possible responses consumers may exhibit to their marketing strategies in order to minimize unintended responses.

In recent decades, applications of neuromarketing and neuropsychology in market research have become popular in providing unbiased measurements of physiological, cognitive, and neural signals to predict consumer motivations and purchase decisions. Many studies examined cognitive and neurological factors, such as activation in brain regions that may influence consumers' brand associations and WTP (willingness to pay) for products. The majority of studies examined neuromarketing tactics through EEG and eye-tracking methods to understand unbiased, implicit decision-making in consumers. Some studies found brain regions associated with emotional, attentional, and memorization factors significantly influenced consumer perceptions, decision-making, and purchasing of brands (Ma et al., 2018; Raiesdana and Mousakhani, 2022). Others discuss the biological mechanisms that drive consumer-brand relationships to influence brand loyalty. For instance, Barraza et al. found that brands that induce oxytocin (a biological substrate of human attachment) in consumers, influence brand perceptions of competence and enhance the use of positive emotional and friend-like language when describing brands (Barraza et al., 2021).

Many studies also discuss psychological factors that drive consumer purchasing, such as social ties, peer acceptance, rewards and losses, group behavior, and altruism. Some studies discuss the influence of social relationships and brand perceptions. For instance, Luan et al. and Madiakkam et al. found that individuals preferred and viewed favorably products recommended or looked at by others (Luan et al., 2017; Madiakkam et al., 2019). Studies also found a positive correlation between winning and purchasing of high-status products, and an inverse loss aversion strategy. This may be explained because winning may boost the self-concept of individuals, who may feel entitled to increased expenditure.

Demographics, such as gender, age, income, and cultural differences seem to play a role in cognitive behavior and consumer purchasing behavior as well. Studies examining the relationship between gender and purchasing behavior found that women and men exhibited differences in neural activity and emotional processing that influenced their perceptions of

existing brands and acceptance of novel brands. Studies also suggest that cultural factors, such as ethnocentrism can influence consumer preferences for local over foreign products, or products recommended by people of shared cultures over foreign cultures – which can be influenced by increased cultural familiarity. It is important to note that factors such as mental or learning disorders can influence perceptions as well, and can have opposite responses from the general population.

Some studies evaluated the effect of branding, aesthetics, and emotional appeals to consumers on purchasing behavior. The majority of studies found that brands can elicit emotional response from consumers, which leads to differentiated brand perception and higher purchasing rates. For instance, in observing arousal levels from blind to uncovered brand tests, Laureanti et al. found that 44% of subjects changed their preference when the brand was uncovered. Furthermore, when faced with two different website interface configurations for similar products (TESLA and Ford electric vehicles), consumers extracted more positive values from the TESLA due to the more visual elements, colors, and interactive features of the website, that generated a greater emotional impact (Mauri et al., 2021). Therefore, the emotional impact of brands' communication networks play a large role in influencing brand perceptions and purchases.

Lastly, several studies examined the effect of advertising in driving consumer purchasing, brand awareness, and brand perceptions. Although advertisements are typically viewed as increasing consumer preference of brands, certain aspects of advertising have greater influence than others. For instance, video commercials with a narrative structure and greater frequency of branding product exposure positively influence consumers' preference for showcased products (Wang et al., 2016). Advertisements with visual aids, such as bar charts or tables, can also influence recall accuracy, attitudes, and behavioral intentions of consumers (Sullivan et al., 2015). Advertisements also bring attention to brands, but do not always garner positive consumer perceptions. For instance, advertisements that evoke arousal are positively correlated with notability, but negative evaluations (Eijlers et al., 2020) that may influence consumers' perceptions of the advertised brand. However, one study by Nuñez-Gomez et al. found that advertising relays different responses in neurotypical and neurodivergent populations. When compared with the neurotypical population, which was found to enjoy complex advertisements, individuals with Aspergers exhibit confusion and displeasure for complicated narratives (Nuñez-Gomez et al., 2020). Therefore, it is important to consider factors that influence different populations of a targeted audience when influencing purchasing behavior.

The content of these programs should be comprehensive. Identifying external and biological drivers of consumer purchasing behavior can provide for more effective and cost-efficient strategies to target consumers. Recognizing consumer preferences and relaying brand messages to consumer preferences is a dual priority. In summary, creating interventions to influence consumer behavior may help to facilitate greater attachments and purchasing of brands from consumers, and, ultimately, extend accessibility of products to consumers who may need them most.

Limitations of the Literature: Methodological Considerations

Several limitations in the literature have been discerned by this review. First is the limited amount of experimental evidence, as many articles were filtered out due to non-study formats. In the studies that meet filtering criteria, small sample sizes in several studies () strike concern. A tertiary area of concern is the variability in format of studies, and collection of evidence. Based



on the research question, ways of obtaining data differed due to cost-saving and access to evidence-collecting methods.

Conclusion

This review is the only document, to the best of my knowledge, that has analyzed these specific internal and external drivers of consumer behavior on branding tactics. The current analysis concludes that consumer influence is susceptible to marketing factors that drive their purchasing behavior. The great majority of studies indicate a positive relationship between neural, psychological, demographic, advertising and brand-related stimuli and consumer brand perceptions and decision-making. A small number of studies indicate a nominal or negative influence of interventions on consumer purchasing behavior. Nevertheless, these data are consistent with theories that interventions can influence consumer purchasing in any direction. There are conflicting data based on consumer responses to different intervention approaches. Therefore, future research is needed to understand why some individuals respond differently to branding tactics while others successfully influence consumer purchasing. Based on the current data, future research could also dissect how to better advocate for neurodivergent populations during advertising and branding tactics. Public and private sectors should look at the results presented in this study to create a more effective marketing plan toward their target consumers.

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