

Effects of Visual Brand Identity on Perceived Healthiness of Fast-Food Among Higher Education Students

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Abstract

Using the theoretical framework Elaboration Likelihood Model (ELM) this study investigated the effects of visual brand identity elements on perceived healthiness of fast-food among higher education students. Survey data were collected from 120 students across four higher education institutions in Damaturu, Nigeria. Based on the data collected, regression analyses were performed in JASP to test the hypotheses regarding the impact of visual brand identity elements on perceived healthiness of fast-food. The results revealed a significant correlation between visual brand identity and perceived healthiness of fast-food ($\beta = 8.118, t = 11.423, p < 0.001$). Specifically, colour scheme ($\beta = -0.312, t = -2.531, p = 0.013$), product shape and structure ($\beta = -0.272, t = -2.338, p = 0.021$), graphics and imagery ($\beta = -0.284, t = -3.345, p = 0.001$), and packaging materials ($\beta = -0.311, t = -2.889, p = 0.005$) were negatively related to students' perceptions of fast-food healthiness. However, logo ($\beta = -0.129, t = -1.528, p = 0.129$) and typography ($\beta = -0.123, t = -0.919, p = 0.360$) did not show significant effects. These findings highlight the importance of visual brand identity in shaping health perceptions among this student population and offer practical implications for fast-food marketers and brand managers to leverage visual cues to promote healthier perceptions.

Keywords: Visual Brand Identity; Perceived Healthiness; Fast-Food; Higher Education Students; Elaboration Likelihood Model (ELM); Marketing

Introduction

The increasing prevalence of fast-food consumption among higher education students (Mokhtar *et al.*, 2020) has raised concerns about its potential impact on their health and well-being (Abraham *et al.*, 2018). Several factors have been identified as responsible for attracting students towards fast-food (Oliveira and Raposo, 2024; Pratheepkumar *et al.*, 2023), including visual elements of the product (Silayoi and Speece, 2007; Vermeir, 2020). For example, the colours on packaging, each carrying a unique meaning, influence consumers' food choices (Mai *et al.*, 2016; Muniz *et al.*, 2023). Similarly, images powerfully influence our visual perceptions of products (Delivett *et al.*, 2022; Gil-Pérez *et al.*, 2020; Lidón *et al.*, 2018; Newman and Schwarz, 2024; Rebollar *et al.*, 2019; Simmonds and Spence, 2017). However, while extant studies have documented the impact of specific visual cues on food choices, there seems to be limited interest among researchers on the collective effect of visual brand identity on perceived healthiness, particularly among local higher education students in Nigeria. This is important as locational differences and cultural nuances are known to impact consumer choices (Jayasuriya *et al.*, 2022; Monday, 2024). This research aims to fill this gap by examining how various visual brand identity elements shapes students' perceived healthiness of fast-food in Damaturu, Nigeria.

Visual brand identity is a tangible appeal to the senses (Wheeler and Meyerson, 2024). Its elements such as graphics (Schifferstein *et al.*, 2022), colours (Lu, 2015; Mai *et al.*, 2016), typography (Das *et al.*, 2023), logos (Johannessen *et al.*, 2021; Lelis *et al.*, 2020), and packaging (de Aguiar, 2024; Gaol and Widaningrum, 2014; Willis, 2022), play pivotal roles in shaping consumer perceptions. These elements, according to the propositions of Petty and Cacioppo's (1986a) elaboration likelihood model (ELM), act as peripheral cues influencing perceptions without requiring in-depth nutritional analysis. This is particularly relevant to students who often make quick, low-involvement food choices (Park *et al.*, 2024; Romer, 2013). Previous studies have shown that specific visual cues, such as natural colours (Vollenbroek, 2021) and handwritten typography (Tok *et al.*, 2024), are often associated with healthiness and premium quality, respectively. Moreover, packaging design can affect perceived value and willingness to pay (de Aguiar, 2024). However, there is a knowledge gap regarding the specific effects of visual brand identity elements on perceived healthiness within the Damaturu context, the interplay between various aesthetic elements, and the influence of demographic variations on consumer preferences.

This study seeks to address these gaps by investigating the effects of graphics and imagery, colour scheme, typography, logo placement, product shape and structure, and packaging materials on perceived healthiness of fast-food among higher education students in Damaturu. The study may inform interventions that can promote healthier food choices and contribute to the well-being of this population, aligning with Bargh's (2022) emphasis on understanding the consumer mind to develop effective health promotion strategies. Also, the findings will offer insights for fast-food marketers and brand managers seeking to promote healthier food options and create a positive impact on public health.

Theoretical Framework and Hypotheses

Petty and Cacioppo's (1986a) ELM was employed in this study as theoretical lens for understanding how visual brand identity influences perceived healthiness of fast-food among higher education students. The ELM is a dual-process framework that explains how people process persuasive messages, either through a central route involving careful evaluation of arguments (e.g., nutritional information) or a peripheral route relying on superficial cues such as visual appeal (Elliott *et al.*, 2024; Petty and Cacioppo, 1986b). Higher education students, often possessing higher cognitive engagement, may be influenced by detailed health-related information embedded in visual brand identity through the central route (Nanu *et al.*, 2024). However, due to their busy lifestyles (Kim *et al.*, 2019), they may also rely on peripheral cues like colour schemes and logos for quick decisions (Romer, 2013). Thus, higher education students, being frequent fast-food consumers (Pratheepkumar *et al.*, 2023; Racine *et al.*, 2022; Sajjad *et al.*, 2023; Tunde *et al.*, 2023) and susceptible to visual marketing cues (Vidal and Castellano-Tejedor, 2022), represent a key demographic for studying the impact of visual brand identity on health perceptions.

Research supports the impact of visual brand identity on perceived healthiness (Bos, 2021; Purnhagen *et al.*, 2016), with studies showing that visual elements can shape consumer perceptions and behaviours through both conscious and subconscious processing (Bargh, 2022; Park *et al.*, 2024). Colours associated with nature and health, for example, can enhance perceived healthiness (Hallez *et al.*, 2023; Steiner and Florack, 2023). Similarly, images of fresh, natural ingredients (Schifferstein *et al.*, 2022; Vollenbroek, 2021), handwritten scripts invoking authenticity (Tok *et al.*, 2024), logos featuring healthy symbols such as fruits, vegetables (Melsen, 2014) or smileys (Abell *et al.*, 2024), product's angularity or roundness (Michalski, 2024; Wang *et al.*, 2022), and plain (Werle *et al.*, 2016) or bright packaging (de Aguiar, 2024; Karnal *et al.*, 2016; Muniz *et al.*, 2023), can shape student perception of the healthiness or otherwise of fast-food. In view of the foregoing theoretical and empirical evidence, this study posits that visual brand identity correlates with students' perceived healthiness of fast-food in higher education institutions. Specifically, the study hypothesises as follows:

H₁: Graphics and imagery correlate with the perceived healthiness of fast-food among higher education students.

H₂: Colour scheme correlates with the perceived healthiness of fast-food among higher education students.

H₃: Typography correlates with the perceived healthiness of fast-food among higher education students.

H₄: Logos correlate with the perceived healthiness of fast-food among higher education students.

H₅: Product shape and structure correlates with the perceived healthiness of fast-food among higher education students.

H₆: Packaging materials correlate with the perceived healthiness of fast-food among higher education students.

Methodology

This study employed a survey research design (Saris and Gallhofer, 2014) to investigate the effects of five visual brand identity elements on perceived healthiness of fast-food among higher education students in Damaturu, Nigeria. Questionnaires, utilising Likert's (1932) agreement scale were used in collecting primary data about the respondents' perceptions and preferences regarding visual brand identity elements and their association with perception of fast-food healthiness. Respondents were drawn from the four higher education institutions (HEIs) in Damaturu: The Federal Polytechnic Damaturu, Yobe State University, College of Nursing and Midwifery, and College of Agriculture. The potentially infinite nature of this population (Wenz *et al.*, 2020) necessitated a convenience sampling approach (Winton and Sabol, 2022) to strategically select respondents from this demographic.

Based on an expert's estimation that the proportion of fast-food buyers (15%) among the student population was at the minimum 15%, and considering the limitations of an infinite population (Arnab, 2017), a sample size of 205 respondents was determined using Charan and Biswas' (2013) formulation. The researcher, along with two assistants, personally administered the questionnaires on the four campuses (Bocarnea *et al.*, 2013). This facilitated real-time clarification of questions and ensured data accuracy. Respondent confidentiality and anonymity were emphasised to encourage candid feedback.

The study constructs were measured using adapted measures drawn from the literature. Thus, items measuring graphics and imagery were adapted from Oladumiye and Ebenezer (2018), colour scheme from Lee and Spence (2023), typography and logo placement from Wheeler and Meyerson (2024), product shape and structure from Ohlhausen *et al.* (2023), packaging materials from de Aguiar (2024) and Werle *et al.* (2016), and perceived healthiness of fast-food from Adams and Geuens (2007), Amar *et al.* (2020) and Reena *et al.* (2021). These items assessed the effects of visual brand identity elements on student perceptions of fast-food healthiness. The data thus garnered were analysed using descriptive analyses (to depict the prevalence of responses across various study variables, revealing dominant trends and patterns), and inferential statistics (to test the hypotheses regarding the effects of visual brand identity on perceived healthiness).

Following the recommendation of Cho (2021) and Oosterwijk (2016), we used Guttman's (1945) λ_2 in JASP (Pfadt *et al.*, 2023) to pilot-test the adapted scales for internal consistency reliability based on data collected from a sample of 38 volunteer students. The results revealed that all the constructs have met the minimum Guttman's λ_2 of 0.720 (Oosterwijk *et al.*, 2016): graphics and imagery ($\lambda_2 = 0.749$), colour scheme ($\lambda_2 = 0.739$), typography ($\lambda_2 = 0.757$), logo placement ($\lambda_2 = 0.762$), product shape and structure ($\lambda_2 = 0.752$), packaging materials ($\lambda_2 = 0.739$), and perceived healthiness of fast-food ($\lambda_2 = 0.822$).

Results

Demographics and Descriptives

The study sample comprised 120 respondents unevenly distributed across four institutions and gender (Figure 1). The Federal Polytechnic Damaturu contributed the most respondents ($n = 47$), followed by the Yobe State University ($n = 35$), College of Agriculture ($n = 31$), and College of Nursing ($n = 7$). Majority of respondents ($n = 86$) are males, outnumbering females ($n = 44$).

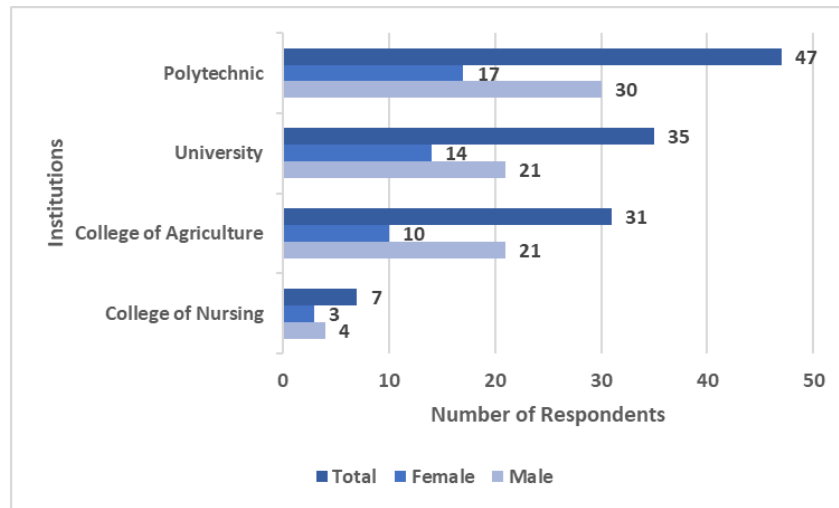


Figure 1. Distribution of Respondents by Gender and Institutions

The descriptive statistics in Table 1 reveal that higher education students generally have a negative perception of fast-food, particularly due to the effects of graphics and imagery ($\bar{x} = 2.36$, $SD = 0.87$) and typography ($\bar{x} = 2.65$, $SD = 0.70$). While other visual brand identity elements like logos ($\bar{x} = 3.42$, $SD = 0.86$), colour ($\bar{x} = 3.40$, $SD = 0.73$), product shape and structure ($\bar{x} = 3.35$, $SD = 0.83$), and packaging materials ($\bar{x} = 3.00$, $SD = 0.85$) are perceived more neutrally or slightly positively, they do not significantly improve the overall negative perception of fast-food. The SD scores highlight the significant variability in students' perceptions, suggesting that effective branding strategies must address these varied perceptions to improve the overall healthiness image of fast-food.

Table 1. Descriptive Statistics

Construct	Mean	SD	SE
Perceived Healthiness	3.780	0.847	0.077
Logo Placement	3.422	0.858	0.078
Colour Scheme	3.397	0.726	0.066
Product Shape and Structure	3.348	0.825	0.075
Graphics and Imagery	2.355	0.873	0.080
Typography	2.652	0.697	0.064
Packaging Materials	2.995	0.848	0.077

Collinearity Statistics

The collinearity statistics in Table 2 revealed no harmful collinearity among the visual brand identity constructs in predicting perceived healthiness of fast-food among higher education students. The tolerance index (TI) values ranged from 0.508 (product shape and structure) to 0.895 (logo placement), all exceeding Ahmad *et al.*'s (2019) threshold of $TI \geq 0.50$, while the variance inflation factor (VIF) values ranged from 1.117 (logo placement) to 1.968 (product shape and structure), all below Sarstedt *et al.*'s (2022) threshold of $VIF \leq 3$. These results confirm that the visual brand identity constructs can be included in the same model without concerns about harmful collinearity. These results justify doing regression analysis. Please prepare your text in good English. Manuscripts with poor English are declined from refereeing process. Authors who feel their English language manuscript may require editing in order to eliminate possible grammatical and spelling errors and to reach to an acceptable level of scientific English, may wish to use the English editing service provided by editorial office of this journal. For more information on this service, visit our instruction for authors section or contact editorial office via website.

Table 2. Collinearity Diagnostics

Construct	Tolerance	VIF
Logo Placement	0.895	1.117
Colour Scheme	0.586	1.707
Product Shape and Structure	0.508	1.968
Graphics and Imagery	0.847	1.180
Typography	0.534	1.871
Packaging Materials	0.560	1.787

Regression Analysis

The regression model (Table 3) revealed that visual brand identity elements significantly predict perceived healthiness of fast-food among higher education students ($R^2 = 0.264$, $F(6, 113) = 6.763$, $p < .001$). The full (H_1) model accounted for 26.4% of the variance in perceived healthiness, indicating a moderate effect. The model demonstrated a significant improvement compared to the null (H_0) model, with a significant increase in explained variance (R^2 change = 0.264, F Change = 6.763, $p < .001$). The root mean square error (RMSE) decreased from 0.847 in the null model to 0.746 in the full model, indicating enhanced predictive accuracy. These findings collectively underscore the importance of visual brand identity in shaping health perceptions among this student population.

Table 3. Model Summary – Perceived Healthiness

Model	R	R ²	Adjusted R ²	RMSE	R ² Change	F Change	df1	df2	p
H ₀	0.000	0.000	0.000	0.847	0.000		0	119	
H ₁	0.514	0.264	0.225	0.746	0.264	6.763	6	113	<.001

The variance analysis (Table 4) revealed that the regression model incorporating visual brand identity elements significantly predicted perceived healthiness of fast-food among higher education students in Damaturu, Nigeria ($F(6, 113) = 6.763$, $p < .001$). The model explained 22.562 of the total 85.392 variance in perceived healthiness, indicating a moderate but significant impact of visual brand identity on how students evaluate the healthiness of fast-food.

Table 4. Analysis of Variance (ANOVA)

Model		Sum of Squares	df	Mean Square	F	p
H ₁	Regression	22.562	6	3.760	6.763	<.001
	Residual	62.830	113	0.556		
	Total	85.392	119			

As shown in Table 5, the overall model supports the hypothesis that visual brand identity correlates with perceived healthiness of fast-food among higher education students (Model: $\beta = 8.118$, $t = 11.423$, $p < 0.001$). Specifically, respectively supporting H_2 , H_5 , H_1 , and H_6 , colour scheme (H_2 : $\beta = -0.312$, $t = -2.531$, $p = 0.013$), product shape and structure (H_5 : $\beta = -0.272$, $t = -2.338$, $p = 0.021$), graphics and imagery (H_1 : $\beta = -0.284$, $t = -3.345$, $p = 0.001$), and packaging materials (H_6 : $\beta = -0.311$, $t = -2.889$, $p = 0.005$) were significantly negatively related to perceived healthiness, indicating that these elements decrease students' perceptions of fast-food healthiness. However, logo (H_4 : $\beta = -0.129$, $t = -1.528$, $p = 0.129$) and typography (H_3 : $\beta = -0.123$, $t = -0.919$, $p = 0.360$) did not significantly affect perceived healthiness, thus not supporting H_4 and H_3 , respectively.

In addition to the regression coefficients, we used part correlation to assess the unique contribution of the five visual brand identity elements to student perception of fast-food healthiness, while partial correlation assesses the relationship between any two variables after controlling for the effects of other variables on both. The results revealed a significant negative relationship between visual brand identity elements and perceived

healthiness of fast-food among higher education students in Damaturu, Nigeria. Specifically, graphics and imagery (partial $r = -0.300$, part $r = -0.270$), colour scheme (partial $r = -0.232$, part $r = -0.204$), and packaging materials (partial $r = -0.262$, part $r = -0.233$) exhibited the strongest negative associations, while logo (partial $r = -0.142$, part $r = -0.123$) and product shape (partial $r = -0.215$, part $r = -0.189$) demonstrated weaker negative relationships with typography (partial $r = -0.086$, part $r = -0.074$) exerting the least negative effect. These findings suggest that visual brand identity elements, particularly graphics and imagery, colour scheme, and packaging materials, have a detrimental impact on students' perceptions of fast-food healthiness, highlighting the need for fast-food brands to reconsider their visual branding strategies in promoting healthier perceptions among this student demographic.

Table 5. Regression Coefficients

Model		β	t	95% CI		p	Decision
				Lower	Upper		
H ₀	(Intercept)	3.780	48.882	3.627	3.933	< .001	
H ₁	(Intercept)	8.118	11.423	6.710	9.526	< .001	
	Logo Placement	-0.129	-1.528	-0.295	0.038	0.129	Not Supported
	Colour Scheme	-0.312	-2.531	-0.556	-0.068	0.013	Supported
	Shape & Structure	-0.272	-2.338	-0.502	-0.042	0.021	Supported
	Graphics and Imagery	-0.284	-3.345	-0.453	-0.116	0.001	Supported
	Typography	-0.123	-0.919	-0.389	0.142	0.360	Not Supported
	Packaging Materials	-0.311	-2.889	-0.525	-0.098	0.005	Supported

Discussions

The present study examined the effects of visual brand identity on perceived healthiness of fast-food among higher education students in Damaturu, Nigeria. The results offer several insights into how the specific visual elements negatively influence students' perceptions of fast-food healthiness. Firstly, and starting with the significant outcomes, the relationship between colour scheme and perceived healthiness of fast-food among higher education students was found to be negative and significant negative (H₂: $\beta = -0.312$, $t = -2.531$, $p = 0.013$), indicating that certain colours may detract from the perceived healthfulness of fast-food. This finding aligns with previous research demonstrating that specific colours can evoke negative associations with healthiness (Hallez *et al.*, 2023; Lu, 2015) and that visual cues like colour influence consumer perceptions of product healthiness (Plasek *et al.*, 2020, 2021; Romer, 2013). Moreover, this study extends the ELM peripheral propositions (Petty and Cacioppo, 1986a) by providing evidence that colour, a peripheral cue, can significantly influence perceived healthiness through low-effort processing, but the direction of this influence may be context-dependent and vary across cultures. However, it contrasts with studies suggesting that specific colours such as green, light and pale colour can enhance perceived healthiness (Mai *et al.*, 2016; Muniz *et al.*, 2023; Steiner and Florack, 2023; Tijssen *et al.*, 2017; Vollenbroek, 2021), possibly due to cultural differences or the complex interplay between colour shades, combinations, and brand image. These results underscore the importance of strategic colour choices in fast-food branding to positively influence product healthiness perceptions, particularly among higher education students.

Secondly, the study also found a significant negative correlation between product shape and structure and perceived healthiness of fast-food among higher education students (H₃: $\beta = -0.272$, $t = -2.338$, $p = 0.021$), which extends ELM's peripheral route (Petty and Cacioppo, 1986b) by providing evidence that product shape, a peripheral cue, can influence perceived healthiness through low-effort processing. This finding aligns with previous studies suggesting that certain shapes, particularly circular ones perceived as less healthy, can decrease perceived healthiness (van Ooijen *et al.*, 2017; Wang *et al.*, 2022). Indeed, Michalski (2024) found that consumers' willingness to purchase a product decreases with its degree of roundedness. This negative impact is consistent across various contexts, including willingness to pay (de Aguiar, 2024) and general

consumer behaviour (van Ooijen *et al.*, 2017). However, the effect of shape may interact with other visual elements and consumer expectations (Johannessen *et al.*, 2021; Ohlhausen *et al.*, 2023), highlighting the need to investigate further how various visual factors contribute to overall healthiness perceptions of fast-food (Bos, 2021) colour. Nevertheless, while some studies found a limited impact of shape on taste and health perceptions (Otting, 2019), the current findings emphasise the importance of considering product shape and structure alongside other visual cues in fast-food branding to effectively shape consumer health perceptions.

Thirdly, the study further established a significant negative correlation between graphics and imagery and the perceived healthiness of fast-food ($H_1: \beta = -0.284, t = -3.345, p = 0.001$), indicating that certain visual elements on packaging may detract from the perceived healthfulness of fast-food. This result aligns with Delivett *et al.*'s (2022) work where it is reported that the front-of-pack health imagery, regardless of its actual health claims, can lead to misperceptions about the healthiness of both healthy and unhealthy foods. Similar works by Gil-Pérez *et al.* (2020) and Lidón *et al.* (2018) strengthened this position. Moreover, package images could have unintended consequences (Hayward and Vartanian, 2019) and may lead to misinformed perceptions (Newman and Schwarz, 2024). These two studies tangentially aligns with our findings but also underscores the complexity of imagery effects. However, our results contrast with studies showing positive effects of specific visual cues on consumer perceptions (Rebollar *et al.*, 2019; Watson *et al.*, 2023). The results indicate that while graphics and images are powerful in shaping perceptions, their impact on healthiness can be complex and sometimes counterproductive, highlighting the need for careful consideration of these elements in fast-food packaging.

Fourthly, the negative relationship between packaging materials and perceived healthiness ($H_6: \beta = -0.311, t = -2.889, p = 0.005$) aligns with previous research suggesting that packaging can significantly influence consumer perceptions of food products. For instance, Karnal *et al.* (2016) found that symbolic cues in packaging can communicate non-verbal health cues. Also, Thackston (2013) demonstrated that packaging material properties can affect consumer food quality perception. Our findings extend this knowledge by showing that packaging materials used in fast-food can negatively impact perceived healthiness among higher education students. This result closely aligns with Werle *et al.* (2016) report that plain packaging can increase unhealthy snack intake. This is because package design as a primary motivator in low-involvement categories like fast-food (Romer, 2013). However, in contrast to our findings, some researchers reported that packaging can enhance perceived healthiness (de Aguiar, 2024; Gaol and Widaningrum, 2014; Willis, 2022). This discrepancy may be attributed to several factors. For instance, certain materials, such as plastic, may be associated with environmental concerns (Nuhija and Makolli, 2023) or unhealthy food choices (Muniz *et al.*, 2023). Additionally, the visual weight of packaging might influence product expectation and evaluation (Yang, 2020). Nevertheless, the findings of this study collectively suggest that while packaging materials play a significant role in shaping health perceptions, their effects are complex and may interact with other packaging attributes.

In contrast to the four significant outcomes, the results on the logo–perceived healthiness relationship was non-significant ($H_4: \beta = -0.129, t = -1.528, p = 0.129$), suggesting that logo may not be a primary driver of healthiness perceptions among higher education students in this context, potentially due to their role as a “peripheral cue” in low-involvement product categories like fast-food (Romer, 2013). This finding contrasts with studies that have shown how products with smiley-integrated logos (Abell *et al.*, 2024) or with logos placed lower on the package (Sundar and Noseworthy, 2014) were perceived as lower in healthfulness and less powerful, respectively; while those with organic labels (Ho *et al.*, 2024; Richetin *et al.*, 2022)/heart icons (Ryan *et al.*, 2014) or with logos placed higher on the package were taken as healthy and more powerful (Sundar and Noseworthy, 2014), respectively. Also, the specific characteristics of logos might not evoke strong associations with healthiness or unhealthiness (Johannessen *et al.*, 2021), and their complex design may further complicates their impact on perceived healthiness (Wheeler and Meyerson, 2024). Overall, the results suggest that for higher education students, logo placement alone may not significantly impact their perceptions of fast-food healthiness.

Finally, the study found no significant correlation between typography and perceived healthiness of fast-food among higher education students ($H_3: \beta = -0.123, t = -0.919, p = 0.360$), aligning with Otterbring *et al.* (2022) who observed no effect of typography on fast-food choices among younger consumers. This contradicts Juni and Gross's (2008) conclusion based on ELM's peripheral cue proposition (Petty *et al.*, 1983) that typography could act as a peripheral cue to persuasion. It also contradicts recent studies indicating that typeface can influence choices and expectations (Kovačević *et al.*, 2022), with handwritten typefaces increasing perceived healthiness (Liu *et al.*, 2019). This discrepancy may be due to the age-related moderating effects noted by Otterbring *et al.* (2022), as younger consumers may be less influenced by typography compared to older individuals, or to cultural factors and familiarity with certain typefaces (Das *et al.*, 2023). Although typography's role in influencing perceived healthiness among higher education students appears limited in this study, it remains a crucial element of brand identity (Wheeler and Meyerson, 2024) and may influence other aspects of consumer perception, warranting further studies in diverse contexts.

To recap, the current study highlights that the visual aspects of fast-food branding play a significant albeit negative role in shaping consumer perceptions of fast-food healthiness. Vivid graphics and imagery often evoke associations with high-calorie or unhealthily prepared foods. Colour schemes commonly used in the fast-food industry (e.g., red, yellow, orange) can trigger perceptions of unhealthiness due to cultural associations or links to specific ingredients. Packaging materials that are visually appealing but appear non-biodegradable or excessive can raise concerns about environmental impact (Nuhija and Makolli, 2023) and over-processed food, further contributing to negative perceptions. This suggests that fast-food brands seeking to improve their health image should consider adjusting these visual elements to align with healthier connotations.

Conclusions

This study highlights the importance of visual brand identity elements in shaping perceptions of healthiness, with implications for understanding how these elements function within the ELM framework (Petty and Cacioppo, 1986b). The negative correlations between perceived healthiness and visual brand identity elements (colour, product shape, graphics, and packaging) suggest these act as peripheral cues in the ELM framework, influencing health perceptions without extensive cognitive processing (Petty *et al.*, 1983). However, the lack of significant effects for logo placement and typography suggests that these factors may not be strong peripheral cues influencing perceived healthiness, aligning with Otterbring *et al.*'s (2022) findings on typography's limited impact on food choices among younger consumers. Thus, this study supports the ELM's assertion that peripheral cues can play a significant role in shaping consumer perceptions (Petty *et al.*, 1983), particularly in contexts where consumers may not be motivated or able to engage in extensive cognitive elaboration.

This study has several practical implications for fast-food marketers targeting higher education students. Given the significant negative relationship between specific visual brand identity elements and perceived healthiness, fast-food brands should carefully consider their visual communication strategies. For example, incorporating colours associated with freshness and natural ingredients (Steiner and Florack, 2023; Vollenbroek, 2021), utilising angular product shapes (Wang *et al.*, 2022), and avoiding images that evoke unhealthy connotations could potentially enhance perceived healthiness. Also, using eco-friendly packaging materials (Karnal *et al.*, 2016; Werle *et al.*, 2016) could further improve healthiness perceptions. While logos and typography did not significantly affect perceived healthiness in this study, they remain crucial elements of visual brand identity (Wheeler and Meyerson, 2024) and should be aligned with the overall brand message and target audience preferences.

This study has several limitations. The findings may not be generalisable to other populations or cultural contexts, as it was conducted in a single geographical location (Damaturu, Nigeria) and focused on a specific demographic (higher education students) (Vispoel *et al.*, 2018). The use of self-reports may introduce response (Kreitchmann *et al.*, 2019) social desirability (Romonți-Maniu, 2021) biases. The study's focus on

visual brand identity excludes other influential factors on perceived healthiness such as taste, price, convenience, brand personality, advertising, and in-store atmosphere (Andrade *et al.*, 2024). Also, the study did not account for potential confounding variables (Andrade, 2024) like dietary habits or nutritional knowledge. Furthermore, the cross-sectional design precludes establishing causal relationships between visual brand identity and perceived healthiness of fast-food (Harré and Moghaddam, 2016). Moreover, the study did not examine potential interaction effects among the visual brand identity elements or the cumulative impact of these branding strategies. Finally, the findings may not be applicable to other food categories or industries.

Finally, future studies should address several limitations identified in this study. Thus, future research should replicate the study in diverse settings to enhance generalizability, employ mixed-methods approaches to gain deeper insights into the underlying mechanisms, and expand the scope of investigation to include other influential factors on perceived healthiness. Additionally, future studies should control for confounding variables, utilise longitudinal designs to establish causality, investigate interaction effects among visual brand identity elements, and extend the research to other food categories and industries.

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