SOCIAL PRESENCE IN OMEGA-3 SUPPLEMENT MARKETING: ELABORATION LIKELIHOOD PROCESSING AMONG YOUNG ADULTS

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ABSTRACT

Backgrounds: The high prevalence of cholesterol in young adults has increased the popularity of dietary supplements. Brochures, both online and offline, are common mediums for communicating product benefits. As humans are inherently social, incorporating social presence into product visuals may enhance user engagement.
Purpose: This study examines the effect of varying levels of social presence in omega-3 supplement photographs on consumers' emotional valence, emotional arousal, and perceived product diagnosticity using the Elaboration Likelihood Model to distinguish between central and peripheral processing routes.
Design/methodology/approach: This study hypothesizes that social presence influences peripheral variables emotional valence and emotional arousal as well as the central variable of product diagnosticity. Fifteen questionnaire items measured these constructs across three social presence scenarios (low, moderate, and high). A total of 114 participants who were familiar with omega-3 supplements and had experience using Instagram were recruited for the study. Data were analyzed using the Friedman test to identify differences between conditions.
Findings/Result: Significant differences were observed across social presence levels. Images with high social presence generated the strongest positive emotional valence and arousal, whereas images with low social presence resulted in superior product diagnosticity. The moderate social presence condition yielded comparatively lower scores across all variables, suggesting limited effectiveness in activating either processing route.
Conclusion: High social presence effectively elicits emotional valence and arousal through peripheral processing, whereas low social presence enhances product diagnosticity via central processing. Moderate social presence failed to strongly activate either route, underscoring the strategic role of visual social cues.
Originality/value (State of the art): This study offers actionable insights for designing health supplement brochures that balance emotional appeal and cognitive clarity, advancing research on social presence and consumer engagement in health communication and marketing.

Keywords: social presence, elaboration likelihood model, omega-3 supplement, friedman test, health supplement brochures

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INTRODUCTION

Cardiovascular diseases are one of the leading causes of mortality worldwide. Recent data indicate a troubling trend among younger populations. In Indonesia, the incidence of heart attacks among individuals under the age of 40 has shown a significant increase in recent years, largely attributed to lifestyle-related risk factors such as elevated cholesterol levels, diabetes, unhealthy dietary patterns, and physical inactivity (Arlinta, 2024). In response to these growing concerns, omega-3 fatty acid supplementation has been widely recognized as an effective method for improving cardiovascular health. Previous research by the American Heart Association confirmed that omega-3 fatty acids may help lower cholesterol levels while also reducing systemic inflammation (Siscovick et al. 2017). Consuming 1 g of omega-3 fatty acids per day can reduce triglyceride levels by 5.9 mg/dL, and this correlation persists even at doses of 7 g/day (Hu et al. 2019). Omega-3 fatty acids also exhibit hypotensive effects or blood pressure reduction, depending on the dose and the patient's level of hypertension (Fonda et al. 2017).

As a health supplement product, consumer trust plays a critical role in determining purchasing behaviors. In an increasingly digital marketplace, visual strategies have become essential for communicating credibility and enhancing consumer intentions. Among visual-based social media platforms, Instagram has emerged as one of the most influential channels, ranking fourth in advertising reach and first in user popularity (AdminDatareportal, 2024). On platforms dominated by imagery, visual content has a substantial impact on purchase intentions because of its relationship with mental imagery and cognitive processing (Li & Xie, 2020).

Mental imagery refers to the cognitive process of envisioning experiences with a product or service (Zhang et al. 2022). This mechanism explains the persuasive power of visual content (Teng & Khong, 2015). According to the Elaboration Likelihood Model, individuals process persuasive information through either a central or a peripheral route (Petty & Cacioppo, 1986). The central route involves the deliberate evaluation of product-related information, such as features, quality, and credibility. Such information is described by scholars as diagnostic cues in product visualization (Poirier et al. 2024). In contrast, the peripheral route triggers emotional valence and arousal, particularly when consumers are less motivated to engage with the content cognitively, such as when browsing social media (Zhang et al. 2022). This explains why social media content is predominantly processed through peripheral routes (Voramontri & Klieb, 2019).

While many companies strive to create visual content that activates peripheral or central route processing, success depends on how identifiable the visual elements are. A significant factor influencing cognitive and emotional reactions to visual content is social presence. Social presence is the extent to which an image conveys a sense of a human being (Johnson & Hong, 2020). Some researchers define social presence into three levels: the highest level of human presence with facial expressions, the middle level of human presence with no facial expressions, and the lowest level of social presence with no physical human presence (Johnson & Hong, 2020). Research has shown that social presence positively affects mental imagery, arousal, and product evaluation (Azer, 2023; Zhang et al. 2022; Jiang & Benbasat, 2003). However, certain studies have highlighted potential drawbacks, such as decreased product understanding when the focus shifts excessively toward human figures instead of the product itself (Kalkstein, 2020; Martinez & Foulsham, 2024). These findings underscore the need to evaluate social presence concerning specific product types and market contexts.

Although previous research suggests that social presence contributes to consumers' emotional and cognitive outcomes, significant gaps remain. Most available research still separately explores emotional responses (arousal and valence) and cognitive evaluations (product diagnostics), and fails to incorporate them into a single consumer response framework. Furthermore, there is limited empirical evidence explaining how social presence functions simultaneously across both pathways in the Elaboration Likelihood Model and whether greater human presence increases emotional engagement (peripheral pathway) and decreases cognitive evaluations (central pathway).

Previously published studies have also been inconsistent, focusing on general e-commerce contexts rather than highly credible products such as health supplements. Furthermore, experimental studies systematically manipulating social presence to varying degrees in images on social media websites are scarce

in the literature. Given these gaps, the primary question explored here is: What impact do varying levels of social presence in Instagram visual content have on consumer responses emotional (arousal and valence) and cognitive (product diagnostics) through central and peripheral processing pathways within the Elaboration Likelihood Model framework?

This study applies the Elaboration Likelihood Model framework to investigate how consumers cognitively and emotionally process social presence through central and peripheral routes of processing. This study contributes to a deeper understanding of how social presence cues in visual marketing affect consumers' interest in the health supplement industry. This study aims to empirically examine the impact of varying amounts of social presence in Instagram-based visual content on customers' purchase intentions for omega-3 supplements to address these existing gaps. Using the Elaboration Likelihood Model as a theoretical framework, it assesses the effects of high, medium, and low social presence cues on responses from peripheral and central route processing. This study quantifies these benefits using statistical analysis and experimental design, providing health supplement marketers with practical insights into optimizing visual methods to enhance consumer trust and influence purchasing decisions in digital contexts.

METHODS

Participants were initially screened based on the inclusion criteria and subsequently asked for informed consent prior to starting the trial. The criteria were as follows: have a basic understanding of omega-3 supplements, have used Instagram at least once, and live in an urban location. All participants were sequentially presented with three standardized product images representing low, medium, and high social presence. A randomized order of image presentation was used to reduce the order effects. To minimize visual bias, all images were standardized to 1,080 × 1,080 pixels in JPG format. Each image displayed identical product specifications in a consistent format. To remove extraneous effects, background colors and supporting graphic elements were standardized across all tiers. The findings were then examined using the mean score for each variable.

After viewing each image, participants scored 15 Likert-scale items on emotional valence, emotional arousal, and product diagnosticity, garnering 45 primary responses across the three conditions. An attention check item was included at the end of the questionnaire as a control for response quality, requiring participants to select response options as instructed. Responses that failed the attention check or showed a clear pattern in responses (e.g., a straight line) were removed from further analysis to maintain the validity of the data.

A sample size of 114 was greater than the minimum recommended size in the multivariate analysis recommended by Hair et al. (2010), allowing sufficient statistical power for within-subject comparisons. The measurement items were developed and adapted from existing scales in the relevant literature to promote content validity of the questionnaire. In detail, the emotional valence and emotional arousal items were derived from popular affective response scales, and the product diagnostic items were adapted from consumer evaluation and information diagnostic constructs. All items were rated based on a 5-point Likert scale and were configured to correspond with the theoretical constructs of peripheral (affective) and central (cognitive) processing and to align with the Elaboration Likelihood Model framework. In the questionnaire, items 1-5 assessed emotional valence, items 6-10 measured emotional arousal, and items 11-15 rated product diagnosticity.

The independent variable in these hypotheses was the level of social presence, with the three images fixed. The dependent variables were divided into two categories: emotional valence and emotional arousal, which represent peripheral processing, while product diagnosticity reflects central route processing (Figure 1). For comparison, the initial analysis used a fixed model-repeated-measured ANOVA to test for differences between the three levels of social presence because this approach is appropriate for within-subject designs with normally distributed interval data. However, when the assumption of normality was violated, as observed through normality tests and inspection of distributions, the analysis systematically transitioned to the Friedman test, which is non-parametric and appropriate for ordinal data and repeated measures, and does not rely on a normal distribution. Thus, robustness and validity were maintained by matching the statistical method for the statistical interpretation of the results to the characteristics of the data. Hypothesis

testing was conducted at a specified significance level (α) to assess both the null and alternative hypotheses. The significance level was set at 0.05 (Table 1).

A post hoc analysis was conducted using the Wilcoxon Signed-Rank Test to examine the impact of different levels of social presence on emotional valence, emotional arousal, and product diagnosticity. Bonferroni test was used to control type I error (false positives). The effect size was analyzed using Kendall's W. Furthermore, an Elaboration Likelihood Model analysis was performed to identify which level of social presence was most effective in activating either the central or peripheral route of persuasion. Recommendations were drawn based on the dominance of social presence in influencing cognitive-processing pathways.

Using the Elaboration Likelihood Model (ELM), this study hypothesizes that the social presence of visual content drives consumer responses through both peripheral and central processing. More specifically, a higher social presence is predicted to create more positive emotional valence (H11a) and be positively related to emotional arousal (H11b), as consumers perceive affective cues in social media content, which operate through the peripheral pathway. Conversely, social presence was hypothesized to play an influential role in product diagnosticity (H12).

According to the Elaboration Likelihood Model (ELM), this study attempts to operationalize the persuasion process by identifying two pathways for processing the selected variables. Social presence is an external stimulus embedded in visual content; emotional arousal and emotional valence are peripheral processing pathways that reflect immediate affective responses that occur with low cognitive resources and are typically activated by visual and social stimuli in contexts such as Instagram. Conversely, product diagnosticity is a central processing pathway, as it captures the extent to which consumers consider a product as information, evaluating its usefulness, clarity, and credibility for decision-making. This operationalization is theoretically based on the line drawn by the ELM between cue-based affective processing and effort-based information evaluation. Consequently, the model's selected variables can reflect both persuasion pathways simultaneously, providing an empirical basis for examining how social presence transitions consumer processing between the emotional (peripheral) and cognitive (central) levels (Figure 1).

This study hypothesizes that the effects of different levels of social presence on consumer responses will be different. High social presence (e.g., prominent human faces and expressions) is expected to lead to the highest emotional arousal and positive emotional valence because strong human stimuli promote affective engagement; however, it may reduce product diagnosticity because attention is diverted from product information. Moderate social presence (e.g., human presence without prominent facial cues) is expected to offer a balance between emotional and cognitive processing, generating emotional engagement while maintaining or increasing product diagnosticity; this level is the most effective overall. Conversely, low social presence (e.g., no human elements) is expected to result in decreased emotional arousal and less positive valence; however, increased focus on product information may contribute to product diagnosticity, albeit with weaker overall engagement. These results suggest that moderate social presence can optimize peripheral and central pathway processing within the Elaboration Likelihood Model framework.

Table 1. Research hypothesis of social presence on elaboration likelihood processing

Purpose	Null Hypothesis	Alternative Hypothesis
To test the effect of social presence levels on emotional arousal	H01a: There is no effect of social presence level on emotional valence	H11a : There is an effect of social presence level on emotional valence
To test the effect of social presence levels on emotional valence	H01b: There is no effect of social presence level on emotional arousal	H11b: There is an effect of social presence level on emotional arousal
To test the effect of social presence levels on product diagnosticity	H02: There is no effect of social presence level on product diagnosticity	H12: There is an effect of social presence level on product diagnosticity

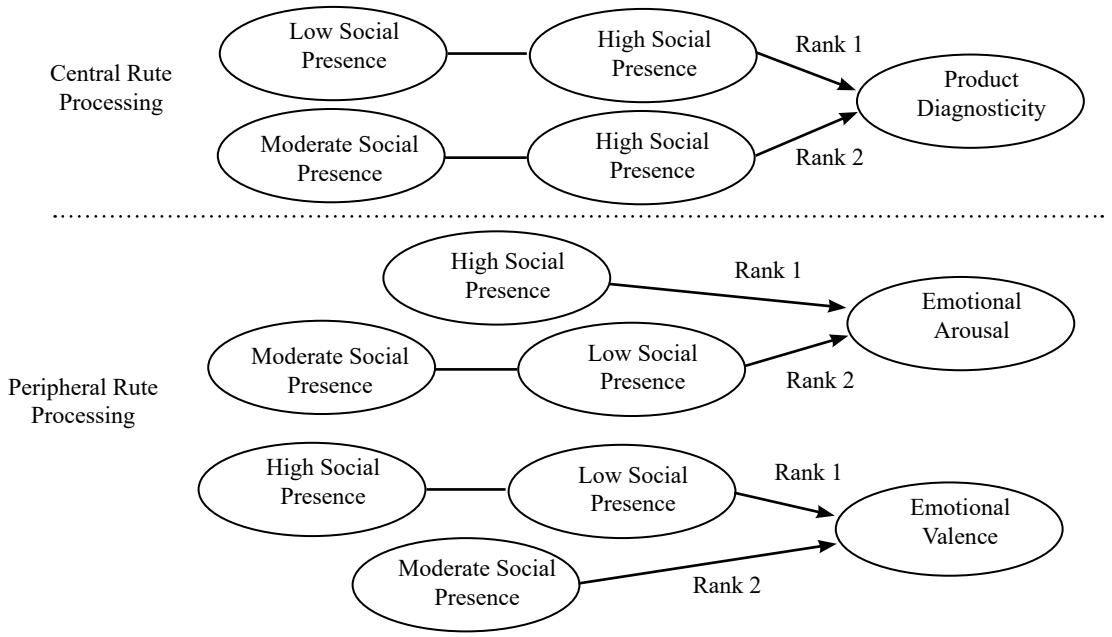

Figure 1. Research model framework

Mental Imagery in Product Photos

Product images are part of product branding that introduces the product and its characteristics (Febriyanti & Farida, 2023). Images on social media trigger emotional reactions among consumers (Lim & Childs, 2020). When viewing images, not only are the visual senses involved, but also areas of the brain that process emotions, such as the amygdala (Feng et al. 2021). In addition to increasing emotional reactions, product photos trigger cognitive elaboration in consumers (Lim & Childs & 2020). Images can provide a strong visual context, enabling consumers to better understand products or services (Paujiah et al. 2022). These two processes occur because visual content engages sensory and perceptual information in consumers' working memory, enabling users to imagine concrete experiences. The ability of images to support the visualization of experiences with a product is referred to as mental imagery (Macinnis & Price, 1987).

Elaboration Likelihood Model

The Elaboration Likelihood Model is a two-way brain processing route when an individual receives persuasive messages: the central and peripheral routes (Petty & Cacioppo, 1986). This model emphasizes the cognitive elaboration process in which individuals engage when processing persuasive communication. In the central route, individuals perform high-level cognitive processing and carefully evaluate the information presented based on logical reasoning, factual evidence, and the perceived quality or effectiveness of a product. Successful persuasion via this route occurs when the presented visual is strong, compelling, and relevant. Visual content that evokes high mental imagery facilitates engagement with the central route by allowing consumers to vividly imagine using or interacting with a product (Zhang et al. 2022). As a result, consumers are more likely to engage in diagnostic evaluation, a process by which they interpret visual cues to assess product quality and performance (Poirier et al. 2024). Persuasion achieved via the central route tends to result in stable consumer decisions that are resistant to counterarguments and competing brand products.

The peripheral route of information processing involves low cognitive effort, where consumers rely more on superficial cues than on the substantive content of the message. This route is activated when individuals are unmotivated or unwilling to engage in detailed message elaboration (Petty & Cacioppo, 1986). In such cases, persuasion occurs through elements such as emotional appeal, endorsements by influencers, or relatable experiences rather than factual analysis. Consumer judgment in this route is primarily shaped by emotional responses to visual content. These affective reactions serve as diagnostic cues that influence content interpretation (Poirier et al. 2024). Since consumers under peripheral processing tend to absorb information

quickly and with limited evaluation, the resulting persuasive effect is often temporary and susceptible to change when confronted with new information or competing stimuli.

Consumers typically seek satisfaction through interaction, entertainment, and informational content on social media platforms. Consequently, images shared on these platforms are often processed via a peripheral route, where consumers exert minimal cognitive effort and rely heavily on emotional cues when evaluating products rather than engaging with in-depth product information (Teng & Khong, 2015). This technique presents a significant challenge in persuasive communication because limited cognitive engagement may hinder the accurate assessment of product quality. However, certain types of social media content can stimulate central route processing, particularly when consumers actively evaluate product features and quality. To enhance cognitive processing, it is essential to evoke stronger mental imagery, which can be facilitated by improving the identifiability of visual elements within the content (Zhang et al. 2022).

Social Presence

Social presence refers to the psychological connection experienced through media, wherein users perceive a sense of human contact that is personal, friendly, and warm (Cyr et al. 2007). The emergence of social presence requires the perceived existence of a human being within a communication medium (Lee, 2004). Social presence fosters closer relationships between consumers and sellers and enhances consumers' understanding of the products they desire (Kim et al. 2021). The proportion of human elements significantly influences the perceived level of social presence in product imagery (Zhang et al. 2022). The levels of social presence were classified based on the visibility of human features in the visual content. A high level of social presence is evoked when a full human face is shown; a moderate level is associated with partial body depictions such as hands or feet, while a low level occurs when no human element is present or only the product itself is displayed (Johnson & Hong, 2020).

Research has shown that social presence directly impacts consumers' emotional responses (Zhang & Shi, 2022). Emotions can be understood through two primary dimensions: valence and arousal (Rietveld et al. 2020). Valence refers to the degree of emotion experienced by an individual, whether positive (pleasant) or negative (unpleasant). Arousal is the level of physiological activation, which can range from low (calm) to high (anxious or excited). Arousal represents the intensity or strength of an emotional response. Furthermore, product photos evoking high positive valence and arousal (Rietveld et al. 2020) and overall social presence (Qin, 2020) have a positive effect on building consumers' intention to purchase the product.

Visual content featuring social presence influences not only emotional responses but also cognitive understanding of the product. This is commonly referred to as product diagnosticity. Cognitive engagement involves the mental process of evaluating products (Dessart, 2017). When consumers view a product accompanied by human elements, they can imagine how the product might be used or in what context it could be applied (Hassanein & Head, 2007). However, the presence of human figures can also divert consumer attention away from the product, potentially reducing diagnostic understanding (Kalkstein et al. 2020). Owing to these contrasting findings, recent research has introduced a distinct definition of moderate social presence. The term is represented by objects or symbols that imply human presence without showing an actual human figure. This type of moderate presence has been found to enhance diagnostic product understanding without diverting focus from the product, while still evoking emotions through implied human cues (Poirier et al. 2024). Product diagnosticity also contributes to purchase intention (Cheng et al. 2022). Comprehensive information is expected to enhance customers'' purchase intentions (Song & Liu, 2021).

Moderate social presence means visual elements that make it look like people are there without showing the whole person. This can include things that look like people, such as hands or silhouettes, or things that stand for people, such as personal items or contextual indicators. Moderate social presence aims to elicit emotional connections and contextual relevance while sustaining product focus, thus achieving a balance between affective engagement and diagnostic clarity.

RESULTS

Descriptive Analysis

A total of 114 eligible respondents aged 15–30 years who were familiar with omega-3 supplements and used Instagram participated in this study. Table 2 presents the mean and standard deviation for each ELM variable at low, medium, and high social presence. The results vividly point to the Elaboration Likelihood Model (ELM) changes that occur with varying social presence levels, that is, the processing of information moves between central and peripheral. At low social presence, consumers tend to use the central route more, concentrating on product-related information. This is evidenced by very high product focus (M = 4.05), product evaluation (M = 3.79), and strong diagnosticity (M = 3.75), which together indicate a detailed cognitive evaluation of the product attributes.

At medium social presence, the level of responses was more balanced. Valence (M = 3.45), arousal (M = 3.18), and diagnosticity (M = 3.57) were at moderate levels, implying that emotional cues and rational evaluation were equally weighted. This situation depicts a transitional stage in which both central and peripheral routes can be used. At high social presence, individuals tend to rely more on peripheral-route processing. Regarding emotional and affective components, hoodiness (M = 3.63), trust (M = 3.83), positive impression (M = 3.81), and emotional changes (M = 3.46) were all higher. In fact, the total valence (M = 3.73) and arousal (M = 3.54) were also at their highest in this case. The findings here are consistent with ELM being a theoretical framework, as it shows social presence as a factor that changes persuasion from rational evaluation to emotional and social engagement (Table 2).

Friedman Test

As the data did not meet the assumption of normality, the non-parametric Friedman test was employed as an alternative to repeated measures ANOVA, using a significance level of 0.05 (Table 3). The results showed significant differences among the three levels of social presence in emotional valence ($\chi^2(2) = 13.180$, $p = 0.001$), emotional arousal ($\chi^2(2) = 26.290$, $p < 0.001$), and diagnosticity ($\chi^2(2) = 8.818$, $p = 0.012$). These p-values indicate that at least one condition of social presence significantly affected each of the three variables. Consequently, the null hypotheses (H01a, H01b, and H02) were rejected, and the alternative hypotheses (H11a, H11b, and H12) were accepted. A Kendall's W value of 0.52 indicates a strong effect, which means that there is a high level of agreement across all repeated conditions. To further investigate the specific conditions that differed, a post hoc analysis was conducted using the Wilcoxon Signed-Rank Test.

Table 2. Statistic Descriptive (Mean (SD))

ELM Var.	Indicator	Social Presence Mean (SD)		
		Low	Medium	High
Valence (X1)	Happiness	3.46 (0.83)	3.18 (0.98)	3.63 (1.05)
	Gratitude	3.46 (0.92)	3.2 (1.03)	3.46 (1.01)
	Positive Impression	3.54 (1.01)	3.48 (1.04)	3.81 (1.01)
	Trust	3.73 (1.01)	3.57 (1.02)	3.83 (1.01)
	Comfort	4.05 (0.96)	3.81 (1.07)	3.9 (1.02)
	Mean	3.65	3.45	3.73
Arousal (X2)	Emotional Changes	2.76 (1.14)	2.96 (1.03)	3.46 (1.02)
	Emotional Intensity	3.05 (1.14)	3.08 (1.12)	3.53 (1.07)
	Curiosity	3.58 (1.01)	3.47 (1.11)	3.81 (1.02)
	Emotional Duration	3.11 (1.13)	3.19 (1.2)	3.37 (1.26)
	Mean	3.13	3.18	3.54
Diagnosticity (X3)	Product Focus	4.05 (0.94)	3.6 (1.09)	3.61 (1.14)
	Understanding Benefits	3.7 (1.06)	3.62 (1.02)	3.7 (1.07)
	Product Assessment	3.61 (0.98)	3.43 (1.07)	3.56 (0.99)
	Product Visualization	3.58 (1.03)	3.55 (1.09)	3.83 (0.91)
	Product Evaluation	3.79 (1.05)	3.65 (1.08)	3.69 (1.13)
	Mean	3.75	3.57	3.68

Table 3. Effects of social presence on emotional valence, arousal, and product diagnosticity

Social Presence Comparison	Superior Emotional Valence	Superior Emotional Arousal	Superior Product Diagnosticity
High vs Moderate	(p = 0.000)	(p = 0.000)	(p = 0.070)
	High	High	No Difference
High vs Low	(p = 0.172)	(p = 0.000)	(p = 0.400)
	No Difference	High	No Difference
Moderate vs Low	(p = 0.000)	(p = 0.265)	(p = 0.015)
	Low	No Difference	Low

Post Hoc Test

Post hoc pairwise comparisons using the Wilcoxon Signed-Rank Test were conducted to examine differences between the levels of social presence. The results are presented in Table 3. The Bonferroni correction also showed results that were consistent with the post-hoc test results for all pairs tested. For emotional valence, the "High vs. Moderate" comparison showed that high social presence elicited significantly higher emotional valence, while the "Moderate vs. Low" contrast revealed that low social presence elicited significantly higher emotional valence than moderate social presence. No significant difference was observed between the high and low conditions. In terms of emotional arousal, the high social presence condition resulted in significantly higher arousal than the moderate and low conditions. However, there was no significant difference between the moderate and low levels of physical activity. Regarding product diagnosticity, no significant differences were found in any comparison except for "Moderate vs. Low," where low social presence resulted in significantly higher product diagnosticity.

The Wilcoxon Signed-Rank Test found that the high social presence condition generated the highest emotional valence and arousal compared to the other levels. In contrast, minimal social presence resulted in the highest product diagnosticity. Modest social presence consistently produced the lowest ratings across all measured factors. These findings show that the high social presence condition engaged the peripheral pathway of information processing, as evidenced by increased emotional reactions (valence and arousal). This conclusion is congruent with the Elaboration Likelihood Model, which states that emotionally charged visual cues have a greater influence on attitudes via the peripheral route (Poirier et al. 2024).

To provide a clearer overview of the findings, Table 4 summarizes the main statistical results, including test statistics, p-values, effect sizes, and the direction of the differences across social presence levels. Overall, the Friedman test results confirmed that social presence significantly influenced all examined variables: emotional valence ($\chi^2(2) = 13.180$, $p = 0.001$), emotional arousal ($\chi^2(2) = 26.290$, $p < 0.001$), and product diagnosticity ($\chi^2(2) = 8.818$, $p = 0.012$). The effect size (Kendall's $W = 0.52$) indicated a strong and consistent effect across conditions.

As shown in Table 4, high social presence generally produces stronger emotional responses, particularly in emotional arousal, which is significantly higher than moderate and low levels. Emotional valence was also higher in the high condition compared to the moderate condition, although the differences between the high and low conditions were not significant. In contrast, product diagnosticity was relatively higher under low social presence, with significant differences observed only between low and moderate conditions. This summary highlights a clear distinction between emotional and cognitive responses, where a higher social presence enhances emotional engagement, whereas a lower social presence supports better product understanding.

This study examined how varying levels of social presence in omega-3 supplement imagery influenced emotional valence, emotional arousal, and perceived product diagnosticity. Grounded in the Elaboration Likelihood Model (ELM), the discussion is organized around each hypothesis and its corresponding findings. Throughout the discussion, emotional valence and arousal are treated as proxy indicators of affective, cue-based processing, whereas product diagnosticity serves as a proxy indicator of cognitive, information-focused processing. Therefore, interpretations are limited to observed response patterns rather than direct claims of central or peripheral route activation.

Table 4. Summary of main statistical results (friedman test and effect size)

Variable	Test	χ^2 (df=2)	p-value	Effect Size (Kendall's W)	Interpretation of Effect	Direction of Difference
Emotional Valence	Friedman	13.180	0.001	0.52	Strong	High > Moderate; Low > Moderate; High ≈ Low
Emotional Arousal	Friedman	26.290	<0.001	0.52	Strong	High > Moderate; High > Low; Moderate ≈ Low
Product Diagnosticity	Friedman	8.818	0.012	0.52	Moderate–Strong	Low > Moderate; High ≈ Moderate; High ≈ Low

H11a proposed that different levels of social presence would lead to differences in emotional valence. The results partially support this hypothesis in the following ways. High social presence produced significantly higher emotional valence than moderate social presence. However, no significant difference was observed between high and low social presence. Empirically, these findings suggest that clearly visible human figures evoke more positive emotions than implied or partial social cues. Simultaneously, product-only imagery elicited emotional valence comparable to a high social presence, indicating that emotional positivity may also arise from perceived clarity, trustworthiness, or familiarity with the product presentation itself.

Prior studies have consistently reported that social presence enhances emotional responses by signaling warmth, friendliness, and interpersonal connection (Cyr et al. 2007; Johnson & Hong, 2020). The current findings are broadly consistent with this literature but also introduce an important nuance: emotional valence is not exclusively driven by the human presence. Within the ELM framework, positive affect is often associated with peripheral cue processing; however, the absence of a difference between high and low social presence cautions against interpreting emotional valence as a singular marker of peripheral processing. Instead, emotional reactions may emerge from multiple visual sources, including the quality of product design and informational clarity. This result refines ELM-based visual persuasion research by suggesting that emotional valence alone may be insufficient to distinguish between processing tendencies when social presence is visually manipulated.

H11b predicted that social presence levels would significantly influence emotional arousal. The data support this hypothesis. High social presence generated significantly higher emotional arousal than moderate and low social presence, whereas no significant difference emerged between moderate and low social presence. The findings indicate that only highly salient human cues, such as visible faces or full human figures, substantially increase emotional intensity. Implied or partial social cues did not produce arousal levels that were distinguishable from product-only imagery.

These results align with prior research demonstrating that human faces and bodies are biologically salient stimuli that heighten physiological activation and attention engagement (Rietveld et al. 2020; Zhang & Shi, 2022).

Within the Elaboration Likelihood Model (ELM), emotional arousal is commonly associated with heuristic or cue-based processing, which refers to a mental shortcut that relies on simple cues rather than a detailed analysis. Nevertheless, because elaboration, motivation, or cognitive effort were not directly measured, it would be inappropriate to conclude that high social presence activated the peripheral route. The results indicate that high social presence corresponds to affective responses typically associated with lower-effort processing. This finding strengthens the argument that arousal is more sensitive than valence to variations in social presence and supports its use as a proxy indicator in visually driven persuasion research, albeit with interpretive caution.

H12 proposed that different levels of social presence would lead to differences in perceived product diagnosticity. This hypothesis was partially supported by the results. Low social presence resulted in significantly higher diagnosticity than moderate social presence, while the differences between low and high and high and moderate social presence were not statistically significant. The significant contrast between low and moderate social presence suggests that implied or partial human cues may hinder consumers' ability to extract clear product information from reviews. The absence of a significant difference

between high and low social presence indicates that the presence of human figures does not necessarily reduce diagnostic understanding, provided that the product remains visually prominent.

These results are consistent with prior findings that social elements can divert attention from product attributes (Kalkstein et al. 2020). However, they also complicate recent arguments that moderate or implied social presence optimally supports cognitive evaluation by balancing emotions and information (Poirier et al. 2024). In this study, moderate social presence did not improve diagnosticity or provoke strong emotional responses, indicating that such cues may heighten cognitive ambiguity rather than promote elaboration. The absence of a distinction between low and high social presence is theoretically significant. This suggests that cognitive processing is not automatically diminished by social cues and that layout dominance, informational hierarchy, and visual clarity may condition how social presence affects diagnostic judgments. This finding underscores the need to treat social presence as an interactive design feature rather than a unidirectional influence.

Managerial Implications

Human faces are neurologically processed faster and are likely to elicit quick, favorable affective reactions. Human facial expressions, body motions, and other visual cues have been proven to activate the amygdala and limbic system, resulting in greater arousal. Consequently, product photographs with a strong social presence remain one of the most powerful visual elements for generating consumer emotions. High social presence is ideal for health supplements that want to elicit emotional involvement, communicate lifestyle benefits, and provide a sense of personal connection or social relatability with potential customers. High social presence is more effective for consumers who are still in the pre-contemplation or consideration stage and may not have made a purchase decision yet. These people are more receptive to emotionally appealing indications, such as human features, expressions, or lifestyle imagery, which can capture their attention and pique their interest. The low social presence condition appears to have used the central route of information processing more effectively, as shown by the improved cognitive evaluations of the product. This finding is consistent with the Elaboration Likelihood Model, which states that, in the absence of emotionally distracting stimuli, customers are more likely to engage in thorough processing of product information.

Product displays without additional social cues improve consumers' capacity to perceive and recall product details by increasing cognitive attention and reducing emotional distraction (Marczak et al. 2024). Customers solely focus their visual attention on the product, enabling them to notice details such as form, brand, capsule type, and labeling. Health supplements, which seek to communicate technical parameters and product functionality to potential customers, find this method particularly appropriate. Low social presence is more suited to consumers who are already in the purchasing decision stage, as they are actively seeking specific information to differentiate between the products. However, the moderate social presence condition failed to activate either the peripheral or central routes, as evidenced by persistently low scores across all categories. This conclusion violates the Elaboration Likelihood Model, which states that moderate social presence should ideally improve the central route by adding inferred social features that aid message comprehension (Poirier et al. 2024).

In this study, the indicated features were insufficiently salient to elicit the emotional responses commonly associated with the peripheral pathway. At the same time, they failed to facilitate deeper cognitive processing required by the central pathway. One possible explanation is that people's cognitive limitations make it difficult to evaluate several visual aspects in a short period of time. Implicit representations require more cognitive effort, which can increase cognitive load and slow information processing (Sweller, 1988). Visual clutter can enhance emotions to some extent (Marczak et al. 2024). However, excessive complexity can lead to attentional fragmentation, reducing emotional engagement. Future research should therefore reevaluate the efficacy of implied social presence. To improve customers' cognitive understanding and emotional attention, implied social features should be relevant to the purpose and product category of the material.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This study demonstrates that different levels of social presence in omega-3 product imagery shape consumers' affective and cognitive responses in a manner consistent with the Elaboration Likelihood Model. High social presence, characterized by visible human figures, is associated with stronger emotional engagement, whereas low social presence supports greater perceived product diagnosticity and facilitates careful evaluation of product attributes. Moderate social presence did not meaningfully enhance either type of response in this study.

These findings align with prior research showing that social presence strengthens emotional engagement and peripheral cue processing in visual and social media contexts (Cyr et al. 2007; Johnson & Hong, 2020; Zhang et al. 2022). Simultaneously, the results extend the existing literature by demonstrating that increased social presence may come at the expense of diagnostic clarity, reinforcing concerns that human elements can divert attention from product information (Kalkstein et al. 2020; Martinez & Foulsham, 2024). The limited effectiveness of moderate social presence partially contradicts claims that human cues optimally balance cognition and emotion (Poirier et al. 2024), suggesting that such effects are context-dependent.

Theoretically, this study refines ELM-based visual persuasion research by differentiating the effects across levels of social presence and highlighting a potential "processing gap" at intermediate levels. Conclusions are limited to emotional responses and perceived diagnosticity, without claims regarding decision stages or behavioral outcomes that are not directly measured.

Recommendations

Based on these conclusions, marketers should tailor omega-3 product imagery to match the consumer's stage in the decision-making process. For audiences in the early stages, it is important to prioritize visuals with high social presence, such as images featuring relatable human figures engaging in healthy lifestyle activities. This approach leverages the peripheral processing route, fostering emotional engagement and creating a sense of social familiarity with the brand. Such imagery can help consumers envision how a product fits into their daily lives, making it more appealing and relatable.

Conversely, for consumers who actively compare alternatives and seek in-depth product knowledge, a low social presence approach is more effective. Visuals with minimal or no human figures stimulate the central processing route, making them ideal for communicating rational attributes such as the ingredients, functionalities, and scientific credibility of omega-3 products. It is crucial to note that moderate levels of social presence were found to be ineffective in activating either processing route, suggesting that design efforts should focus on clear high or low social presence cues. Further research is warranted to optimize moderate social cues and their application to specific product categories.

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