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Pricing Cues in Digital Supplement Advertising: An Eye-Tracking Study of Visual Attention and Purchase-Intention Preferences

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ABSTRACT

This exploratory study examined whether psychological, promotional, and reference pricing were associated with visual attention and purchase-intention preference in supplement advertisements. Forty exercisers (20 women and 20 men) viewed 12 advertisements covering arginine, creatine, branched-chain amino acids, and whey protein. For each participant and product set, the computer independently randomized the three pricing conditions. Eye movements were recorded with an SMI RED 250 eye tracker. Because participant-level gaze records were unavailable in the retained export, time to first fixation and the fixation-duration metric reported in that export were analyzed descriptively. Purchase-intention preferences were evaluated using Chi-square goodness-of-fit tests and Cohen's w. Psychological pricing showed the shortest mean time to first fixation, whereas reference pricing showed the highest aggregate fixation-duration value. Promotional pricing received the highest preference for arginine (55.0%), creatine (57.5%), and branched-chain amino acids (65.0%); psychological pricing was preferred for whey protein (82.5%). Preference distributions differed significantly from an equal distribution for all product categories, with medium-to-large or large effect sizes. Aggregate gaze patterns did not consistently correspond with product-specific preferences. The findings suggest that pricing cues may operate differently across supplement categories and that gaze indicators should not be treated as proxies for purchase-related evaluation.

Keywords: Eye Tracking, Psychological Pricing, Promotional Pricing, Reference Pricing, Visual Attention, Purchase-Intention Preference
JEL Classifications: M31, D12, C91

1. INTRODUCTION

Price is a central cue in e-commerce advertising. In addition to representing the monetary cost of a product, it may influence consumers' perceptions of affordability, quality, sacrifice, and value (Monroe, 2003; Zeithaml, 1988). These evaluations depend not only on the amount charged but also on how that amount is presented and compared with internal or external standards (Mazumdar et al., 2005). A price placed just below a round-number threshold, a discount message, or a comparison between a previous and a current price may therefore lead consumers to evaluate otherwise similar offers differently.

This issue is particularly relevant to digital advertisements for sports supplements. Products such as arginine, creatine, branched-chain amino acids (BCAA), and whey protein are often presented through visually dense advertisements containing packaging, product claims, brand elements, and price information. As competing products may offer similar performance- or recovery-related benefits, the way in which price is communicated can become an important part of consumers' evaluations.

Eye-tracking provides a means of observing how consumers distribute their visual attention while viewing these advertisements. Measures such as time to first fixation and fixation duration

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indicate how quickly an Area of Interest (AOI) is reached and how long it is visually inspected (Wedel and Pieters, 2008; Orquin and Mueller Loose, 2013). However, visual attention is not equivalent to persuasion or purchase intention. Consumers may inspect an element because it is prominent, informative, unfamiliar, or difficult to compare. Gaze measures should therefore be considered together with a separate purchase-related outcome rather than being interpreted as direct evidence of preference (Wedel and Pieters, 2008; Orquin and Mueller Loose, 2013).

Previous studies have examined attention to price and other commercial cues in online and retail settings. Pieters and Wedel (2004) showed that brand, pictorial, and textual elements perform different roles in attracting and transferring attention. Menon et al. (2016) found that price level and price visibility affected fixation patterns on social-commerce pages, while Schröter et al. (2021) demonstrated the usefulness of eye tracking in hypothetical online shopping tasks. Johnson et al. (2022) combined eye tracking with self-reported purchase intention to examine the roles of price, discount, star rating, and time pressure in online purchasing decisions. Bogomolova et al. (2020) further demonstrated that making unit-price information more visually prominent could increase attention to it without producing a comparable change in product choice. Summerlin and Powell (2022) also showed that price and digital product presentation can influence online purchase intention. Together, these studies indicate that visual attention and purchase-related responses are connected but distinct outcomes.

Existing research has generally focused on absolute price levels, price visibility, the presence of a discount, or the layout of a price label. Comparatively little is known about how psychological, promotional, and reference pricing differ when they are tested within the same eye-tracking design. Evidence is also limited in the digital supplement market, where familiarity, expected price levels, and purchase experience may differ across product categories.

The present study addresses this gap by comparing psychological, promotional, and reference pricing in digital advertisements for arginine, creatine, BCAA, and whey protein. Visual attention is examined through AOI-based measures, including time to first fixation and the fixation-duration metric retained in the available export, together with heat maps illustrating the overall distribution of gaze. Participants also select the advertisement that most increases their willingness to purchase within each product category. Because this outcome is based on a forced choice among three advertisement conditions rather than a validated multi-item scale, it is referred to as purchase-intention preference.

The study contributes to the literature in three ways. First, it compares three theoretically distinct pricing strategies under a common experimental procedure. Second, it treats visual attention and purchase-intention preference as separate consumer responses. Third, it examines whether the observed patterns vary across four supplement categories. Gender-specific patterns are also reported as secondary, descriptive findings.

The following research questions were addressed:

- RQ1. What descriptive patterns are observed in time to first fixation and fixation-duration values across psychological, promotional, and reference pricing conditions?
- RQ2. Which pricing strategy receives the highest purchase-intention preference for arginine, creatine, BCAA, and whey protein?
- RQ3. To what extent do aggregate visual-attention patterns correspond descriptively with product-specific purchase-intention preferences?
- RQ4. What descriptive patterns are observed by gender?

2. LITERATURE REVIEW

2.1. Pricing Cues in E-Commerce Advertising

Consumers rarely evaluate an advertised price as an isolated numerical value. They may compare it with a price remembered from an earlier purchase, an expected market price, or another value presented in the advertisement. Such internal and external reference points influence how consumers judge the attractiveness of the current offer (Biswas et al., 1993; Kalyanaram and Winer, 1995; Mazumdar et al., 2005; Winer, 1986). Price presentation therefore provides a frame through which an offer may be perceived as affordable, discounted, or advantageous.

The present study focuses on psychological, promotional, and reference pricing. Although all three approaches aim to influence price evaluation, they communicate value in different ways.

Psychological pricing relies on the numerical presentation of price, particularly amounts positioned immediately below round-number thresholds. Price endings are widely used in markets and can communicate affordability, value, or quality depending on the consumption context (Aalto-Setälä, 2005; Naipaul and Parsa, 2001). Consumers do not always process every digit with equal weight. A price such as 99.90 may therefore be perceived as meaningfully lower than 100.00 because greater emphasis is placed on the leftmost digits (Thomas and Morwitz, 2005). Computational ease may also influence judgments of price differences (Thomas and Morwitz, 2009). The size and direction of these effects may nevertheless vary according to product category, price level, and prior experience. Psychological pricing should not therefore be assumed to produce the same response for every supplement product.

Promotional pricing communicates a temporary economic advantage through a discount, campaign message, or special offer. Sales promotions may provide utilitarian benefits, such as financial savings and convenience, as well as hedonic benefits associated with obtaining a favorable deal (Chandon et al., 2000). Their effectiveness depends on how the promotion is framed and interpreted. The use of cents or percentage formats, for example, can influence price expectations and choice (DelVecchio et al., 2007). Price promotions can also influence evaluations of product quality or the brand when consumers use them as information about the offer (Raghubir and Corfman, 1999). Meta-analytic evidence further indicates that promotional effects may continue after the promotional period and vary

according to promotion characteristics and product context (DelVecchio et al., 2006).

Reference pricing displays the current price together with a previous, regular, recommended, or comparative price. The additional value serves as an external standard against which consumers evaluate the current offer (Mazumdar et al., 2005; Kalyanaram and Winer, 1995). Because reference pricing requires the inspection and comparison of more than one numerical value, it may lead to longer visual examination than a single-price format. Longer viewing, however, does not necessarily mean that the offer is considered more favorable. It may simply reflect the additional comparison required by the price display.

The three strategies thus involve different forms of price communication. Psychological pricing relies primarily on numerical perception, promotional pricing makes the claimed saving explicit, and reference pricing encourages a comparison between prices. Their effectiveness should consequently be evaluated through both visual-attention measures and a separate purchase-related response.

2.2. Visual Attention and Eye-Tracking Measures

Digital advertisements contain several elements competing for limited visual attention. Product images, textual claims, brand identifiers, prices, and promotional statements may not receive equal levels of inspection. Advertising value depends partly on the informativeness and usefulness consumers perceive in advertising content (Ducoffe, 1996). Eye tracking records the location and timing of gaze during exposure and provides information that cannot be obtained solely from post-exposure recall (Pieters and Wedel, 2004; Wedel and Pieters, 2008).

AOIs are commonly defined around visual elements that are directly related to the research question. Time to first fixation indicates how long it takes the gaze to reach a particular AOI. Fixation duration indicates the length of an individual fixation, whereas total dwell time, fixation count, and revisit count provide complementary information about the attention allocated to the area (Wedel and Pieters, 2008; Orquin and Mueller Loose, 2013). Heat maps offer a useful visual summary of aggregate gaze distribution, but participant-level AOI measures are needed for systematic comparisons between experimental conditions.

Eye-tracking indicators also require cautious interpretation. A short time to first fixation may show that an element was noticed relatively quickly. A longer fixation may indicate additional inspection, but it may arise from interest, complexity, ambiguity, or the need to compare information. Visual attention can influence decision processes, but a gaze measure does not directly identify the consumer's evaluation of the observed element (Orquin and Mueller Loose, 2013). It should not therefore be described as a direct measure of liking, perceived value, cognitive approval, or willingness to purchase.

For this reason, the present study treats attention and purchase-intention preference as related but separate outcomes. Attention may precede intention and contribute to consumer decision formation, but the relationship is not necessarily linear (Milosavljevic and Cerf, 2008). Neurophysiological and behavioral measures may also provide information beyond traditional self-report indicators of advertising effectiveness (Venkatraman et al., 2015). The price format that attracts attention most rapidly or receives the longest inspection may therefore not be the format selected by participants.

2.3. Eye-Tracking in Price and Online Purchase Research

Menon et al. (2016) used eye-tracking to examine fixation time on price and total fixation time on Facebook pages displaying clothing products. Their experiment varied price level and price visibility, as well as other presentation features. The findings demonstrated that price-related characteristics can influence gaze behavior in a social-commerce environment. Purchase intention, however, was not the principal outcome of that study.

Johnson et al. (2022) examined online purchasing decisions using eye movements and self-reported purchase intention. Their experiment included price, discount, star rating, and time pressure as purchasing cues. Lower prices, larger discounts, and more favorable ratings were associated with higher purchase intention, while eye-movement data provided additional information about the attention allocated to the available cues. The study is methodologically relevant because it combines gaze behavior and a purchase-related response, but it does not compare psychological, promotional, and reference pricing as distinct strategies.

Bogomolova et al. (2020) investigated how the position, font size, signposting, color highlighting, and consistency of unit-price labels affected eye movements and product choice. Making unit-price information more noticeable increased visual attention, whereas the corresponding change in better-value product choice was more limited. This supports the distinction between noticing price information and using that information as the basis for a final choice.

Other e-commerce studies have applied eye-tracking to commercial information beyond price. Chen et al. (2022) examined how consumers attended to different types of online review information and related fixation-based measures to purchasing decisions. Riswanto et al. (2024) assessed attention to several advertising elements alongside questionnaire-based measures of visual engagement, customer satisfaction, and purchase intention. These studies are methodologically relevant because they collect visual-attention and post-exposure responses separately, although neither directly compares the three pricing strategies examined in the present study.

More recently, Li et al. (2025) used a within-subject eye-tracking design to investigate the combined roles of price and display complexity in consumers' likelihood to buy horticultural products. Their study examined both attention to price signs and a purchase-related outcome, illustrating the growing use of gaze measures alongside rather than in place of stated consumer responses.

Overall, the evidence indicates that price, discounts, ratings, reviews, and label design can influence visual attention. It

also suggests that the most rapidly noticed or longest-viewed information does not always produce the strongest purchase-related response (Menon et al., 2016; Johnson et al., 2022; Bogomolova et al., 2020; Chen et al., 2022; Riswanto et al., 2024; Li et al., 2025). However, previous research does not adequately explain how psychological, promotional, and reference pricing compare when they are applied to the same products under a common eye-tracking procedure.

2.4. Supplement Products and the Research Gap

Supplement products provide a relevant context in which to examine these differences. Consumers who exercise regularly may be familiar with arginine, creatine, BCAA, and whey protein, but their knowledge, price expectations, and purchasing experience may differ between categories. A pricing format that is effective for a frequently purchased or familiar product may therefore not produce the same response for a less familiar product.

Digital supplement advertisements also place multiple cues within a restricted visual area. Product packaging, product names, performance-related statements, prices, discounts, and comparison cues may all compete for attention. Psychological pricing may draw relatively rapid attention through its numerical structure. Promotional pricing may communicate a financial benefit directly. Reference pricing may require longer inspection because two prices must be read and compared. These possibilities concern observable gaze behavior; they do not in themselves establish that one strategy is more persuasive than another.

Previous studies have examined consumer attention to price levels, discounts, price labels, ratings, and online reviews (Menon et al., 2016; Johnson et al., 2022; Bogomolova et al., 2020; Chen et al., 2022; Riswanto et al., 2024; Li et al., 2025). However, limited evidence is available on the direct comparison of psychological, promotional, and reference pricing across the same product categories and within the same eye-tracking procedure. Nor does the existing literature establish that the price condition receiving the earliest or longest attention will necessarily receive the highest purchase-intention preference.

The conceptual framework distinguishes two parallel response pathways. Psychological pricing is expected to facilitate rapid perceptual processing through below-threshold numerical presentation; promotional pricing makes an explicit utilitarian saving salient; and reference pricing requires comparative processing of two price points. These mechanisms may shape visual attention differently from purchase-intention preference, while product-category expectations may condition the preference response.

- Pricing strategy → perceptual processing and visual attention to pricing cues
- Pricing strategy × product-category expectations → purchase-intention preference

The two pathways may converge or diverge. The framework therefore treats gaze measures as indicators of observable attentional processing and the forced-choice response as a separate purchase-related evaluation; it does not assume that earlier or longer viewing necessarily indicates a more favorable response.

3. MATERIALS AND METHODS

3.1. Study Design

This study used a laboratory-based, within-participant eye-tracking design in which price presentation was experimentally manipulated. For each participant and each product set, the computer independently randomized the order of the psychological-, promotional-, and reference-pricing advertisements, thereby preventing any one pricing condition from being systematically tied to an ordinal position. The study examined visual attention and purchase-intention preference in response to the three pricing conditions. Given the aggregate form of the available gaze data, the study was framed as exploratory and the eye-tracking outcomes were interpreted descriptively.

The design included two factors. The first was pricing strategy, with three conditions. The second was product category, with four conditions: arginine, creatine, branched-chain amino acids (BCAA), and whey protein. Each participant viewed all three pricing conditions for each of the four product categories, resulting in 12 advertisement exposures per participant.

Visual attention was recorded during advertisement exposure using eye tracking. Following each three-advertisement product set, participants selected the pricing condition that most increased their willingness to purchase. Visual-attention measures and purchase-intention preference were treated as separate outcomes because gaze behavior does not directly represent liking, persuasion, or purchase intention (Wedel and Pieters, 2008; Orquin and Mueller Loose, 2013).

3.2. Participants

The study included 40 volunteers, comprising 20 women and 20 men. Participants were recruited through convenience sampling from individuals who engaged in regular exercise and reported familiarity with sport-supplement products. Eligibility was assessed through self-report before the eye-tracking session. Participants were required to provide informed consent and successfully complete the eye-tracker calibration procedure. No additional demographic eligibility restrictions were applied.

Participation was voluntary. Before the experiment, participants were informed about the study procedure and provided written informed consent. All participants were tested individually and completed the eye-tracker calibration procedure before stimulus presentation.

The equal representation of women and men allowed gender-specific patterns to be reported. However, gender was treated as a secondary descriptive variable because the primary purpose of the study was to compare pricing strategies and product categories.

3.3. Product Selection and Advertisement Stimuli

The four supplement categories—arginine, creatine, BCAA, and whey protein—were selected purposively because they are

recognizable products within the sport-supplement market and could be represented using comparable digital-advertisement formats. The selection also enabled the same three pricing strategies to be examined across multiple product categories. For each category, three digital advertisements were developed to represent psychological, promotional, and reference pricing, producing 12 experimental stimuli.

The advertisements were created specifically for the study by a professional graphic designer. Existing commercial advertisements, actual brand names, and established brand identities were not used. This decision was intended to reduce the influence of brand familiarity, brand loyalty, prior advertising exposure, and existing brand attitudes.

The advertisements followed a common design framework. Within each product category, typography, packaging presentation, overall composition, and the placement of the main visual elements were held as consistent as practicable. The intended experimental difference was the form of the price cue. Nevertheless, promotional and reference displays necessarily contained additional textual or numerical information, which may have increased visual complexity relative to the psychological-pricing display.

In the psychological-pricing condition, the price was displayed using a non-rounded or below-threshold numerical ending. In the promotional-pricing condition, the advertisement contained an explicit discount or campaign message. In the reference-pricing condition, the current price was displayed together with a previous or comparative price. The experimental stimulus structure is summarized in Table 1.

3.4. Eye-Tracking Apparatus and Experimental Setting

Eye movements were recorded using an SMI RED 250 remote eye-tracking system and processed in SMI BeGaze. Participants were seated approximately 70 cm from the display, and a nine-point calibration procedure was completed before stimulus presentation. The original export retained for the present manuscript did not include detailed fixation-detection parameters or trial-level tracking-quality indicators. This limitation was considered when interpreting the eye-tracking findings descriptively.

Testing was conducted individually in a controlled laboratory environment. The screen characteristics, room lighting, participant position, and viewing distance were kept consistent throughout the experiment.

Table 1: Experimental stimulus structure

Product category	Psychological pricing	Promotional pricing	Reference pricing	Total
Arginine	1	1	1	3
Creatine	1	1	1	3
BCAA	1	1	1	3
Whey protein	1	1	1	3
Total	4	4	4	12

Data collection began after calibration was accepted by the system. During the experiment, eye detection was monitored continuously, and calibration was repeated when necessary.

Eye tracking provides objective information about where and when visual attention is allocated. However, gaze measures describe observable visual behavior and should not be interpreted independently as direct evidence of favorable evaluation or purchase intention (Wedel and Pieters, 2008; Orquin and Mueller Loose, 2013).

3.5. Areas of Interest and Eye-Tracking Outcomes

Areas of Interest (AOIs) were defined around the advertisement elements directly related to the research questions. The main AOIs were:

1. The price-tag area;
2. The discount or comparative-price message area; and
3. The brand-related area.

Two numerical eye-tracking outcomes were used:

- Time to first fixation (TFF): the elapsed time between advertisement onset and the first fixation within the relevant AOI, expressed in milliseconds;
- Fixation-duration metric: the strategy- and gender-level mean value labelled "fixation duration" in the retained export, expressed in milliseconds. The export did not preserve sufficient metadata to determine whether this metric represented average duration per fixation or cumulative fixation time within the AOI.

A lower TFF indicated that an AOI was reached earlier. A larger fixation-duration value indicated a higher value on the metric labelled "fixation duration" in the retained export, but the metric's precise computational basis could not be reconstructed. The two outcomes were therefore treated as distinct descriptive gaze indicators. Earlier fixation may reflect rapid attention capture; however, the fixation-duration values cannot be interpreted uniquely as average fixation length, cumulative dwell time, cognitive effort, or favorable evaluation.

Heat maps were generated in SMI BeGaze to illustrate aggregate gaze concentration. They were used as supplementary visual representations and were not interpreted as independent evidence of cognitive approval, perceived value, or purchasing intention. The AOIs and eye-tracking measures are summarized in Table 2.

3.6. Purchase-Intention Preference Measure

After viewing the three pricing conditions prepared for each product category, participants answered the following standardized question:

"Which of these three advertisements increases your purchase intention the most?"

Participants selected one advertisement corresponding to psychological, promotional, or reference pricing. The same question and response format were used for arginine, creatine, BCAA, and whey protein.

Table 2: Areas of Interest and eye-tracking measures

Element or measure	Operational definition	Analytical role
Price-tag AOI	Region containing the main advertised price	Attention to the central pricing cue
Promotional/comparative AOI	Region containing the discount message or comparative price	Attention to promotional and reference-price information
Brand-related AOI	Region containing the product name or brand-like identity	Attention to product identity
Time to first fixation	Time from advertisement onset to the first fixation within an AOI	Speed of initial attention
Fixation-duration metric	Strategy- and gender-level mean value labelled "fixation duration" in the retained export; exact computation not preserved	Descriptive fixation-related processing
Heat map	Aggregate representation of gaze concentration	Descriptive visualization

Because this measure required a forced choice among three advertisements rather than completion of a validated multi-item purchase-intention scale, it was defined as purchase-intention preference. The measure indicates the pricing condition most strongly associated with participants' stated willingness to purchase. It does not represent actual purchasing behavior or a comprehensive psychometric measure of purchase intention.

3.7. Experimental Procedure

Data collection was conducted individually. After receiving information about the study and providing written consent, participants were seated approximately 70 cm from the display. A nine-point calibration was then completed using the SMI RED 250 system.

Participants viewed 12 advertisements arranged in four product sets: arginine, creatine, BCAA, and whey protein. Within each product set, the computer independently randomized the order of the three pricing conditions for every participant. Thus, psychological, promotional, and reference pricing did not occupy a fixed ordinal position across participants or product sets.

Each advertisement was displayed for 10 s. A 1.5-s black screen was presented between consecutive advertisements. The presentation of the three advertisements and the two intervening black screens therefore lasted approximately 33 s for each product set, excluding the time required to answer the preference question.

After the three advertisements for a product category had been presented, all three advertisements were displayed simultaneously on the response screen and labelled A, B, and C. While the advertisements remained visible, participants used the keyboard or mouse to select the advertisement that most increased their willingness to purchase. Only one response was permitted for each product category, and participants had up to 30 s to respond. The researcher also recorded the selected option on a standardized response form. The same procedure was then repeated for the remaining product categories. The procedure is summarized in Figure 1.

3.8. Data Processing

Eye-tracking recordings were processed using SMI BeGaze. TFF and fixation-duration values were extracted in milliseconds for the predefined AOIs. Heat maps were generated separately for women and men and for each product and pricing condition.

The available eye-tracking export contained only strategy- and gender-level summary values. Participant-level and trial-level gaze records, dispersion statistics, product-specific AOI summaries, and metadata defining the exact computation of the fixation-duration metric were not available for reanalysis. Accordingly, TFF and fixation-duration outcomes were summarized descriptively and were not subjected to repeated-measures inferential tests, participant-level correlations, or predictive models.

Because the female and male groups were equal in size, overall strategy-level means were calculated as the arithmetic mean of the two gender-group means. Purchase-intention preference responses were coded as psychological, promotional, or reference pricing and summarized by product category and gender.

3.9. Statistical Analysis

Purchase-intention preference was summarized using frequencies and percentages. For each product category, a Chi-square goodness-of-fit test assessed whether observed preferences differed from an equal distribution across the three pricing strategies. Equal probabilities were specified as the null distribution because no a priori preference advantage was assigned to any of the three experimentally constructed advertisements.

Under the null hypothesis, each strategy was expected to receive one-third of the 40 selections, giving an expected frequency of 13.33 per pricing condition. All expected cell frequencies therefore exceeded five.

The Chi-square statistic was calculated as:

$$\chi^2 = \Sigma([O–E]^2/E) \quad (1)$$

where O is the observed frequency and E is the expected frequency.

Effect size was calculated using Cohen's *w*:

$$w = \sqrt{(\chi^2/N)} \quad (2)$$

where N is the number of participants contributing a preference for the relevant product category. Values of approximately 0.10, 0.30, and 0.50 were interpreted as small, medium, and large effects, respectively (Cohen, 1988).

Gender-specific preference distributions were reported descriptively. Confirmatory gender-interaction tests were not used because gender was not the primary experimental factor and some gender-specific cells included low or zero frequencies.

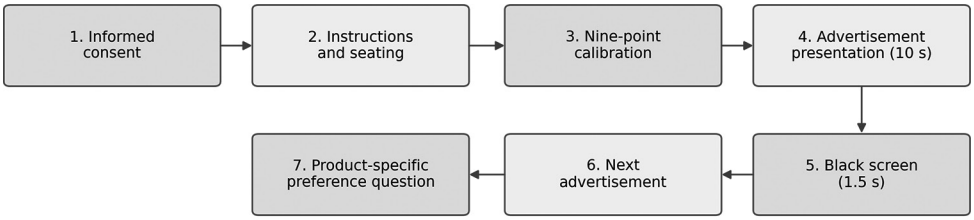
The relationship between visual attention and purchase-intention preference was examined at the descriptive pattern level. Strategy-

Table 3: Visual-attention measures by pricing strategy and gender

Pricing strategy	Women TFF (ms)	Men TFF (ms)	Overall TFF (ms)	Women fixation-duration value (ms)	Men fixation-duration value (ms)	Overall fixation-duration value (ms)
Psychological pricing	468	492	480.0	248	262	255.0
Promotional pricing	673	751	712.0	289	304	296.5
Reference pricing	724	640	682.0	336	349	342.5

TFF: Time to first fixation. Overall values are arithmetic means of the equally sized women and men groups. The retained export labelled the second gaze metric "fixation duration" but did not preserve metadata defining whether it represented average duration per fixation or cumulative fixation time. No participant-level dispersion estimates or inferential condition tests were available

Figure 1: Experimental sequence for each product set. For every participant and product set, the computer independently randomized the order of the three pricing conditions. The preference question followed completion of each set



The sequence was repeated for each of the four product categories.

level TFF and fixation-duration values were compared with product-specific preference distributions to determine whether lower TFF or higher fixation-duration values occurred in the same condition as the most frequent purchase-intention preference. These comparisons were not interpreted as participant-level correlations, predictive associations, or causal relationships.

Statistical significance was set at $P<0.05$. Exact P-values, degrees of freedom, and Cohen's w were reported.

3.10. Ethical Approval and Informed Consent

The study was conducted in accordance with the Declaration of Helsinki and was approved by the relevant institutional ethics committee ([institution anonymized for peer review], Decision No. 18, February 19, 2025; official document number withheld for blinded review). All participants received information about the procedure and provided written informed consent before data collection.

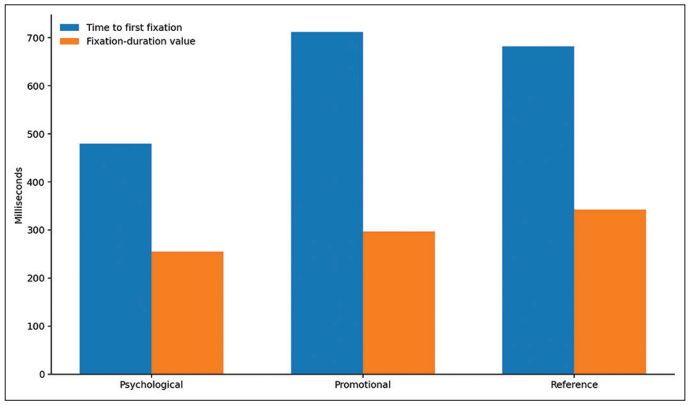
4. RESULTS

4.1. Visual-Attention Measures

Visual attention was summarized using time to first fixation (TFF), the fixation-duration metric reported in the retained export, and aggregate heat maps. Psychological pricing showed the shortest overall mean TFF, whereas reference pricing showed the largest overall mean fixation-duration value. Because only strategy- and gender-level summary values were available, the eye-tracking results were interpreted descriptively. The strategy- and gender-specific visual-attention values are reported in Table 3.

Psychological pricing showed the shortest TFF for both women and men, while reference pricing showed the largest mean fixation-duration value in both groups. Women reached the promotional-pricing AOI earlier than men, whereas men reached the reference-pricing AOI earlier than women. These aggregate differences are descriptive only; no dispersion estimates or participant-level tests were available to establish condition or gender effects. The overall pattern of these two gaze measures is illustrated in Figure 2.

Figure 2: Mean time to first fixation and the aggregate fixation-duration value reported in the retained export by pricing strategy. Bars display two conceptually distinct gaze measures on a common millisecond axis for descriptive visualization only; their magnitudes should not be interpreted as directly comparable indicators of advertising effectiveness



4.2. Heat-Map Findings

Heat maps were used to illustrate the spatial distribution of gaze across the advertisements. Across product categories and gender groups, gaze concentration was generally located around the main price, discount message, and comparative-price information. The heat maps were used as descriptive visual summaries and were not interpreted as evidence of preference, perceived value, or purchase intention. Product-specific heat maps for arginine, creatine, BCAA, and whey protein are presented in Figures 3-6.

For arginine, gaze concentration was located mainly around the numerical price, the discount message, and the old-new price comparison. The reference-pricing condition distributed

Figure 3: Arginine advertisements by gender. The upper row shows women and the lower row shows men; columns show psychological, promotional, and reference pricing from left to right. Heat-map intensity represents aggregate gaze concentration



Figure 4: Creatine advertisements by gender. The upper row shows women and the lower row shows men; columns show psychological, promotional, and reference pricing from left to right. Heat-map intensity represents aggregate gaze concentration



attention across both price values, whereas the psychological and promotional conditions concentrated attention within more compact price-related regions.

For creatine, price-related regions remained the principal focal areas. The promotional condition directed attention toward the discount cue, whereas the reference condition distributed attention across the previous and current prices. Attention to the product and brand-like regions was present but less concentrated.

For BCAA, attention was distributed between the price-related regions and parts of the product or brand-like area. The promotional and reference conditions nevertheless maintained visible gaze concentration around their respective pricing cues. The BCAA heat-map patterns are shown in Figure 5.

For whey protein, the numerical price displays were prominent in both groups. The psychological-pricing condition showed concentrated gaze around the price ending, whereas the promotional and reference conditions directed attention toward the discount or comparative-price information. The whey protein heat-map patterns are shown in Figure 6.

4.3. Purchase-Intention Preference

Purchase-intention preference varied by product category. Promotional pricing received the largest number of selections for arginine, creatine, and BCAA, whereas psychological pricing was most frequently selected for whey protein. Gender-specific purchase-intention preferences are reported in Table 4, and the overall preferences with Chi-square goodness-of-fit results are presented in Table 5.

The preference distribution differed significantly from an equal three-category distribution for all products. Promotional pricing was selected by 55.0% of participants for arginine, 57.5% for creatine, and 65.0% for BCAA. Psychological pricing was selected

Figure 5: BCAA advertisements by gender. The upper row shows women and the lower row shows men; columns show psychological, promotional, and reference pricing from left to right. Heat-map intensity represents aggregate gaze concentration



Figure 6: Whey protein advertisements by gender. The upper row shows women and the lower row shows men; columns show psychological, promotional, and reference pricing from left to right. Heat-map intensity represents aggregate gaze concentration



Table 4: Purchase-intention preference by gender, product category, and pricing strategy

Product category	Gender	Psychological pricing, n (%)	Promotional pricing, n (%)	Reference pricing, n (%)
Arginine	Women	4 (20.0)	10 (50.0)	6 (30.0)
	Men	5 (25.0)	12 (60.0)	3 (15.0)
Creatine	Women	3 (15.0)	12 (60.0)	5 (25.0)
	Men	4 (20.0)	11 (55.0)	5 (25.0)
BCAA	Women	4 (20.0)	13 (65.0)	3 (15.0)
	Men	5 (25.0)	13 (65.0)	2 (10.0)
Whey protein	Women	16 (80.0)	4 (20.0)	0 (0.0)
	Men	17 (85.0)	3 (15.0)	0 (0.0)

Percentages are calculated within each gender group (n=20 women; n=20 men). Gender-specific values are descriptive and were not subjected to confirmatory interaction tests

Table 5. Overall purchase-intention preferences and Chi-square goodness-of-fit tests

Product category	Psychological pricing, n (%)	Promotional pricing, n (%)	Reference pricing, n (%)	χ^2	df	P-value	Cohen's w
Arginine	9 (22.5)	22 (55.0)	9 (22.5)	8.45	2	0.015	0.46
Creatine	7 (17.5)	23 (57.5)	10 (25.0)	10.85	2	0.004	0.52
BCAA	9 (22.5)	26 (65.0)	5 (12.5)	18.65	2	<0.001	0.68
Whey protein	33 (82.5)	7 (17.5)	0 (0.0)	45.35	2	<0.001	1.06

Expected frequency under the equal-probability null model was 13.33 for each pricing condition. Cohen's w was calculated as $\sqrt{(\chi^2/N)}$; approximately 0.10, 0.30, and 0.50 indicate small, medium, and large effects, respectively

by 82.5% of participants for whey protein, and no participant selected the reference-pricing condition for this product. Effect sizes were medium-to-large for arginine and large for creatine, BCAA, and whey protein. The overall purchase-intention preference distributions are illustrated in Figure 7.

4.4. Descriptive Correspondence Between Attention and Preference

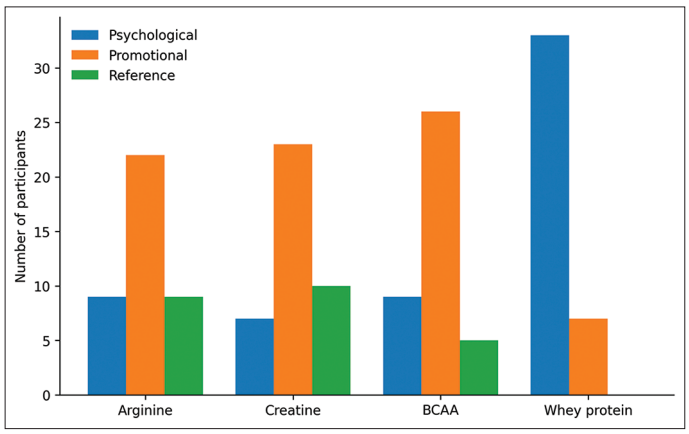
At the aggregate descriptive level, the gaze and preference outcomes did not follow the same pattern across pricing strategies. Psychological pricing produced the shortest mean TFF and was most frequently preferred for whey protein. Promotional pricing had the longest mean TFF but received the highest preference for arginine, creatine, and BCAA. Reference pricing produced the highest aggregate fixation-duration value but was not the most frequently selected strategy for any product. This descriptive correspondence is summarized in Table 6.

This summary indicates a descriptive divergence between the aggregate gaze metrics and purchase-intention preference. It does not establish statistical correspondence, independence, or prediction at the participant level because individual gaze values were unavailable.

4.5. Gender-Specific Patterns

Women and men showed similar product-level preference patterns. Promotional pricing was the most frequently selected condition for arginine, creatine, and BCAA in both groups, and psychological pricing was the most frequently selected condition for whey protein. Promotional pricing was selected by 50.0% of women and 60.0% of men for arginine, 60.0% of women and 55.0% of men for creatine, and 65.0% of both groups for BCAA. Psychological pricing for whey protein was selected by 80.0% of women and 85.0% of men. These findings were treated as descriptive and were not interpreted as statistically confirmed gender differences.

Figure 7: Overall purchase-intention preference by product category and pricing strategy. Bars represent the number of participants selecting each pricing condition



5. DISCUSSION

This study examined how psychological, promotional, and reference pricing were associated with visual attention and purchase-intention preference in digital advertisements for arginine, creatine, BCAA, and whey protein. Three main findings emerged. First, psychological pricing showed the shortest mean time to first fixation, whereas reference pricing produced the highest aggregate fixation-duration value. Second, promotional pricing was the most frequently selected condition for arginine, creatine, and BCAA, while psychological pricing was strongly preferred for whey protein. Third, the condition with the highest aggregate fixation-duration value was not the condition most frequently selected. These findings support the treatment of aggregate gaze indicators and purchase-intention preference as related but distinct consumer responses.

5.1. Visual Attention to Pricing Cues

Psychological pricing showed the shortest overall mean time to first fixation, indicating that the relevant price area was reached earlier than in the promotional- and reference-pricing conditions. One possible explanation is that below-threshold price endings provide a compact and familiar numerical cue that can be detected relatively quickly. Research on the left-digit effect suggests that consumers may place greater weight on the initial digits of a price when evaluating an amount positioned immediately below a round-number threshold (Thomas and Morwitz, 2005). The present finding concerns the timing of attention, however, and should not be interpreted as evidence that participants necessarily perceived the psychological price as cheaper or more attractive.

Reference pricing produced the highest aggregate fixation-duration value in the retained export. This pattern is compatible with the additional numerical information contained in the reference-price display, which presented both a comparative price and a current price. Reference-price theory proposes that external comparison prices provide a standard against which the current offer can be evaluated (Mazumdar et al., 2005; Kalyanaram and Winer, 1995). However, because the export did not preserve the computational definition of the metric, the higher value cannot be attributed uniquely to longer individual fixations, greater cumulative dwell time, cognitive effort, credibility, or favorable evaluation.

The distinction between TFF and the retained fixation-duration metric is important. TFF indicates how soon an AOI is reached, whereas the second metric can be interpreted only as the aggregate value labelled “fixation duration” in the available export. The two

Table 6: Descriptive correspondence between visual-attention measures and purchase-intention preference

Pricing strategy	Overall TFF (ms)	Overall fixation-duration value (ms)	Purchase-intention preference pattern
Psychological pricing	480.0	255.0	Highest for whey protein
Promotional pricing	712.0	296.5	Highest for arginine, creatine, and BCAA
Reference pricing	682.0	342.5	Not highest for any product

This table compares aggregate strategy-level gaze summaries with product-specific preference frequencies. It does not report a participant-level correlation, association test, or predictive model

measures should not be treated as interchangeable indicators of advertising effectiveness (Wedel and Pieters, 2008; Orquin and Mueller Loose, 2013). The results indicate relatively rapid access to the psychological-pricing cue and a higher aggregate fixation-duration value for reference pricing; neither pattern, on its own, establishes purchase preference.

The heat maps also showed that price-related areas were prominent across the supplement advertisements. This finding is consistent with Menon et al. (2016), who reported that price-related characteristics influenced gaze behavior in a social-commerce setting. Johnson et al. (2022) likewise showed that consumers attended to price, discounts, ratings, and other information relevant to online purchasing decisions. The present study extends this work by comparing three conceptually different pricing formats under the same experimental procedure.

5.2. Purchase-Intention Preference Across Product Categories

Promotional pricing received the highest purchase-intention preference for arginine, creatine, and BCAA. The preference distributions differed significantly from an equal distribution for all three products, with medium-to-large or large effect sizes. Promotional pricing accounted for 55.0% of preferences for arginine, 57.5% for creatine, and 65.0% for BCAA.

A plausible explanation is that an explicit discount or campaign message made the economic advantage of the offer easier to identify. Promotional pricing communicates savings directly, whereas psychological pricing depends on numerical presentation and reference pricing requires comparison between two price points. Sales promotions can provide utilitarian benefits through monetary savings and may also contribute to the positive experience of obtaining a favorable deal (Chandon et al., 2000). Johnson et al. (2022) similarly reported stronger stated purchase intention for products presented with larger discounts.

These findings do not indicate that promotional pricing will be preferred for every supplement product or in every market context. Preference for a promotional display may depend on the credibility and magnitude of the discount, consumers' expected prices, and previous exposure to similar campaigns. Repeated price promotions may also influence subsequent evaluations of the brand or its regular price (Raghubir and Corfman, 1999; DelVecchio et al., 2006). The present results therefore document a relative preference for clearly presented promotional pricing in three product categories, rather than a general advantage of discount-based communication.

Whey protein produced a different result. Psychological pricing was selected by 82.5% of participants, promotional pricing by 17.5%, and reference pricing by none of the participants. This marked difference indicates that the observed preference pattern varied across product categories.

Whey protein may have been more familiar or easier to evaluate for participants who exercised regularly and had knowledge of supplement products. Greater familiarity could provide clearer expectations regarding typical prices, making numerical endings more meaningful. However, product familiarity, prior purchase frequency, internal reference prices, and category involvement were not measured separately. These possibilities should therefore be regarded as interpretations to be tested in future research rather than established explanations.

The whey protein result nevertheless indicates that pricing formats should not be treated as context-free techniques. Promotional pricing received the largest share of preferences for three products but not for whey protein. Price presentation may therefore warrant evaluation in relation to product-specific expectations and purchasing habits.

5.3. Visual Attention and Purchase-Intention Preference

The most important overall pattern was the absence of a consistent correspondence between the aggregate fixation-duration metric and purchase-intention preference. Reference pricing had the highest aggregate fixation-duration value but was not the most frequently selected strategy for any product. Promotional pricing had an intermediate value but received the most preferences for three products. Psychological pricing had the lowest value and was strongly preferred for whey protein.

This pattern is consistent with the broader view that gaze-based indicators do not necessarily correspond to a more favorable consumer response (Orquin and Mueller Loose, 2013; Wedel and Pieters, 2008). It also aligns with the distinction between attention and intention proposed by Milosavljevic and Cerf (2008). Bogomolova et al. (2020) similarly found that greater attention to unit-price information did not lead to an equivalent increase in better-value product choices, while Riswanto et al. (2024) treated visual attention and questionnaire-based purchase responses as distinct outcomes. In the present study, however, the precise process represented by the fixation-duration metric cannot be specified from the retained export.

The present results should not be interpreted as evidence that visual attention and purchase preference are statistically unrelated. The gaze data were available as aggregated strategy- and gender-level means, whereas purchase-intention preference was recorded categorically. The study therefore identified a descriptive difference between the overall attention and preference patterns but did not test a participant-level association.

Even within this analytical boundary, the findings show why advertising effectiveness should not be inferred solely from heat maps or an aggregate fixation-duration value. A gaze metric may differ across pricing conditions without identifying which condition participants prefer. Future research linking each participant's fully defined AOI measures with that participant's advertisement choice would allow this relationship to be tested more directly.

5.4. Gender-Specific Patterns

Women and men showed broadly similar purchase-intention preference patterns. Promotional pricing was the most frequently

selected strategy for arginine, creatine, and BCAA in both groups, whereas psychological pricing was preferred for whey protein. Psychological pricing also produced the shortest TFF, and reference pricing produced the highest fixation-duration value for both women and men.

Some numerical differences were observed. Men selected promotional pricing more frequently than women for arginine, while women selected it slightly more frequently for creatine. For BCAA, the proportions were identical, and psychological pricing for whey protein was selected by 80% of women and 85% of men. These differences were small and did not form a consistent gender-specific pattern.

The balanced sample supported descriptive comparison, but the study was not designed primarily to test pricing strategy × gender interactions. The findings therefore indicate broadly similar responses across women and men rather than statistically established gender differences.

5.5. Contributions to Pricing and Advertising Research

Within its exploratory and aggregate-data boundaries, the study contributes to pricing and digital-advertising research in three respects.

First, it distinguishes between the speed of initial attention, the aggregate fixation-duration metric retained in the export, and purchase-intention preference. Psychological pricing was reached earlier, whereas reference pricing produced the highest fixation-duration value. These findings suggest that different price formats may be associated with distinct gaze patterns rather than a single general attentional response.

Second, the findings reinforce the distinction between attention and purchase-related evaluation. Earlier studies have examined price visibility, discounts, unit-price labels, online reviews, and display complexity using eye-tracking methods (Menon et al., 2016; Johnson et al., 2022; Bogomolova et al., 2020; Chen et al., 2022; Riswanto et al., 2024; Li et al., 2025). The present study adds a direct comparison of psychological, promotional, and reference pricing within the same procedure.

Third, the product-specific preference results show that responses to pricing presentation are not necessarily stable across product categories. Promotional pricing was most frequently preferred for arginine, creatine, and BCAA, whereas psychological pricing was dominant for whey protein. This pattern supports the view that pricing cues should be evaluated in relation to the product category rather than as universally effective techniques.

5.6. Practical Implications

The findings offer cautious implications for digital supplement advertising. In contexts similar to the present stimuli, advertisers may consider promotional pricing when the objective is to communicate an immediate economic advantage. Explicit discount messages received the highest purchase-intention preference for arginine, creatine, and BCAA; therefore, clear presentation of the saving may be more useful than visually competing secondary elements.

Psychological pricing may merit consideration in categories where consumers have clearer expectations about typical prices. Its strong preference for whey protein is consistent with, but does not demonstrate, an explanation based on familiarity or internal reference prices because those mechanisms were not measured. The result should therefore be treated as a product-specific pattern requiring direct testing.

Reference pricing should be designed with particular attention to clarity and credibility. Although it produced the highest aggregate fixation-duration value, it attracted comparatively few preferences. The previous and current prices should be easy to read and compare, and the basis of the comparison should be credible. The present findings indicate that a higher aggregate gaze value does not, by itself, establish that consumers consider the offer more attractive.

More broadly, digital advertisers should assess pricing communications using more than one outcome. Eye-tracking can show whether a cue is noticed, whereas preference, clicking behavior, add-to-cart decisions, and actual purchase data are needed to evaluate later stages of consumer response. The most visually prominent price presentation may not be the one most likely to support conversion.

5.7. Limitations and Future Research

The findings should be interpreted in light of several methodological considerations. First, the sample consisted of 40 regular exercisers familiar with supplement products, and only limited demographic information was available in the manuscript dataset. This profile was relevant to the advertising context but restricts generalizability to consumers with different ages, exercise habits, socioeconomic backgrounds, or supplement experience. Larger and more diverse samples should directly measure product familiarity, price sensitivity, previous purchases, and internal reference prices.

Second, the available eye-tracking data were summarized at the pricing-strategy and gender levels. This allowed descriptive comparison of TFF and the fixation-duration metric reported in the export but did not permit participant-level modelling of the relationship between gaze behavior and advertisement choice. Future research should retain trial-level AOI data, full metric definitions, fixation count, total dwell time, revisits, and participant-specific attention–choice relationships for repeated-measures or mixed-effects analysis.

Third, purchase-intention preference was measured through a single forced-choice question. This procedure enabled direct comparison among the three advertisements but did not capture the broader dimensions of purchase intention. Subsequent studies could combine advertisement preference with validated multi-item scales and behavioral indicators such as clicks, add-to-cart decisions, willingness to pay, or actual purchases.

Fourth, the computer independently randomized the order of the three pricing conditions for each participant and each product set, reducing systematic confounding between pricing strategy and ordinal position. Nevertheless, the retained dataset did not include the sequence records required to test whether particular randomized orders were associated with gaze or preference responses. The controlled laboratory setting also differed from natural online shopping. Future experiments should retain sequence information, include manipulation checks, and test the cues in realistic e-commerce or social-media environments.

Despite these limitations, the study offers a randomized exploratory comparison of three pricing presentations across four supplement categories and maintains a clear conceptual separation between aggregate gaze patterns and purchase-intention preference. Its principal value lies in identifying product-specific patterns and methodological questions for confirmatory research using participant-level gaze data, fully specified eye-tracking metrics, and behavioral purchase outcomes.

6. CONCLUSION

The study identified different aggregate gaze and purchase-intention preference patterns across psychological, promotional, and reference pricing displays in digital supplement advertisements. Psychological pricing was associated with the shortest mean TFF, whereas reference pricing produced the highest aggregate fixation-duration value. Promotional pricing was most frequently preferred for arginine, creatine, and BCAA, while psychological pricing was strongly preferred for whey protein.

The pricing condition with the highest aggregate fixation-duration value was not consistently the condition receiving the highest preference. This finding reinforces the need to evaluate gaze indicators and purchase-related responses separately. It also indicates that pricing strategies should be evaluated in relation to product category rather than applied uniformly across supplement advertisements.

Within the present stimuli, clearly communicated promotional savings were associated with the highest preference for three products, whereas a psychological price ending was dominant for whey protein. Although the computer randomized condition order for every participant and product set, the gaze data remained aggregated and purchase preference was measured with a single forced-choice item. The findings should therefore be interpreted as exploratory product-specific patterns rather than causal evidence of pricing effectiveness.

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9. ETHICAL APPROVAL AND INFORMED CONSENT

The study was conducted in accordance with the Declaration of Helsinki and was approved by the Ethics Committee of the Faculty of Sports Sciences, Atatürk University (Decision No. 18, 19 February 2025; official document No. E-70400699-000-2500070929, issued on 25 February 2025). All participants received information about the procedure and provided written informed consent before data collection.

REFERENCES

Aalto-Setälä, V. (2005), How do markets behave? The adjustment of price endings. Journal of Product and Brand Management, 14(7), 455-459.

Biswas, A., Wilson, E.J., Licata, J.W. (1993), Reference pricing studies in marketing: A synthesis of research results. Journal of Business Research, 27(3), 239-256.

Bogomolova, S., Oppewal, H., Cohen, J., Yao, J. (2020), How the layout of a unit price label affects eye movements and product choice: An eye-tracking investigation. Journal of Business Research, 111, 102-116.

Chandon, P., Wansink, B., Laurent, G. (2000), A benefit congruency framework of sales promotion effectiveness. Journal of Marketing, 64(4), 65-81.

Chen, T., Samaranayake, P., Cen, X., Qi, M., Lan, Y.C. (2022), The impact of online reviews on consumers' purchasing decisions: Evidence from an eye-tracking study. Frontiers in Psychology, 13, 865702.

Cohen, J. (1988), Statistical Power Analysis for the Behavioral Sciences. 2nd ed. Hillsdale, NJ: Lawrence Erlbaum Associates.

DelVecchio, D., Henard, D.H., Freling, T.H. (2006), The effect of sales promotion on post-promotion brand preference: A meta-analysis. Journal of Retailing, 82(3), 203-213.

DelVecchio, D., Krishnan, H.S., Smith, D.C. (2007), Cents or percent? The effects of promotion framing on price expectations and choice. Journal of Marketing, 71(3), 158-170.

Ducoffe, R.H. (1996), Advertising value and advertising on the web. Journal of Advertising Research, 36(5), 21-35.

Johnson, R.L., Nambiar, D., Suman, G. (2022), Using eye movements to assess underlying factors in online purchasing behaviors. International Journal of Consumer Studies, 46(4), 1365-1380.

Kalyanaram, G., Winer, R.S. (1995), Empirical generalizations from reference price research. Marketing Science, 14(3), G161-G169.

Li, J., Behe, B., Huddleston, P., Thatcher, S. (2025), The role of price in display complexity's impact on horticultural plant purchase intention: An eye-tracking study. Journal of Retailing and Consumer Services, 82, 104124.

Mazumdar, T., Raj, S.P., Sinha, I. (2005), Reference price research: Review and propositions. Journal of Marketing, 69(4), 84-102.

Menon, R.G.V., Sigurdsson, V., Larsen, N.M., Fagerstrøm, A., Foxall, G.R. (2016), Consumer attention to price in social commerce: Eye-tracking patterns in retail clothing. Journal of Business Research, 69(11), 5008-5013.

Milosavljevic, M., Cerf, M. (2008), First attention then intention: Insights from computational neuroscience of vision. International Journal of Advertising, 27(3), 381-398.

Monroe, K.B. (2003), Pricing: Making Profitable Decisions. 3rd ed. Burr Ridge, IL: McGraw-Hill/Irwin.

Naipaul, S., Parsa, H.G. (2001), Menu price endings that communicate value and quality. Cornell Hotel and Restaurant Administration Quarterly, 42(1), 26-37.

Orquin, J.L., Mueller Loose, S. (2013), Attention and choice: A review on eye movements in decision making. Acta Psychologica, 144(1), 190-206.

Pieters, R., Wedel, M. (2004), Attention capture and transfer in advertising: Brand, pictorial, and text-size effects. Journal of Marketing, 68(2), 36-50.

Raghubir, P., Corfman, K. (1999), When do price promotions affect pretrial brand evaluations? Journal of Marketing Research, 36(2), 211-222.

Riswanto, A.L., Ha, S., Lee, S., Kwon, M. (2024), Online reviews meet visual attention: A study on consumer patterns in advertising, analyzing customer satisfaction, visual engagement, and purchase intention. Journal of Theoretical and Applied Electronic Commerce Research, 19(4), 3102-3122.

Schröter, I., Grillo, N.R., Limpak, M.K., Mestiri, B., Osthold, B., Sebti, F., Mergenthaler, M. (2021), Webcam eye tracking for monitoring visual attention in hypothetical online shopping tasks. Applied Sciences, 11(19), 9281.

Summerlin, R., Powell, W. (2022), Effect of interactivity level and price on online purchase intention. Journal of Theoretical and Applied Electronic Commerce Research, 17(2), 652-668.

Thomas, M., Morwitz, V.G. (2005), Penny wise and pound foolish: The left-digit effect in price cognition. Journal of Consumer Research, 32(1), 54-64.

Thomas, M., Morwitz, V.G. (2009), The ease-of-computation effect: The interplay of metacognitive experiences and naive theories in judgments of price differences. Journal of Marketing Research, 46(1), 81-91.

Venkatraman, V., Dimoka, A., Pavlou, P.A., Vo, K., Hampton, W., Bollinger, B., Hershfield, H.E., Ishihara, M., Winer, R.S. (2015), Predicting advertising success beyond traditional measures: New insights from neurophysiological methods and market response modeling. Journal of Marketing Research, 52(4), 436-452.

Wedel, M., Pieters, R. (2008), Eye tracking for visual marketing. Foundations and Trends in Marketing, 1(4), 231-320.

Winer, R.S. (1986), A reference price model of brand choice for frequently purchased products. Journal of Consumer Research, 13(2), 250-256.

Zeithaml, V.A. (1988), Consumer perceptions of price, quality, and value: A means-end model and synthesis of evidence. Journal of Marketing, 52(3), 2-22.