

ACADEMIC PAPER

How salient pictures in magazine advertisements bias consumers' preference construction: A comparison with product pages in e-stores applying dual system model

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Abstract

This article compares the preference construction strategies that consumers adopt when reading magazine ads or browsing e-stores. Decision processes are constrained by the structure of the context, so this research started with a pilot study that explored the use of salient background pictures in both contexts; the findings showed that magazine ads often featured dominant pictures, but product pages in e-stores usually did not. In line with dual system theory, magazine ads thus may encourage picture-based processing (System I), whereas product pages in e-stores may encourage attribute-based processing (System II). Two studies support these predictions. In Study 1, the product with the worst attributes but the most attractive background pictures was more likely to be chosen by consumers reading a magazine than by those browsing an e-store. Study 2 affirmed that ad pictures, rather than product attributes, dominated evaluations. Together, these findings indicate that dominant pictures in magazine advertisements encourage intuitive processing and bias analytical processing.

1 | INTRODUCTION

This study compares two scenarios to demonstrate how people adopt different decision strategies in different contexts in which pictures dominate to varying degrees. Consider a consumer who needs to buy facial lotion. Two common scenarios are possible: Some consumers will flip through a fashion magazine, where major brands advertise heavily, construct preferences among the available brands, and then make a subsequent purchase at a brick-and-mortar store. Other consumers browse e-stores, evaluate the available options, and purchase online. If the same set of competing brands, which offer varying product performance, was to run magazine advertisements and appear in online stores, would consumers in each channel select them to the same or different degrees? In which setting do appealing product options have better chances of being chosen, and what process explains this effect? This study explores these questions using a dual system model.

Consumers' purchase decision processes have long been the focus of consumer behavior research. A consensus suggests that people are contingent decision makers, such that their decisions are subject to the influence of contextual factors (Bettman, Luce, & Payne, 1998). Scholars refer to this phenomenon as "bounded rationality" (Simon, 1982): Decision making is not always rational and may involve various

biases in different contexts (Kahneman, 2003). For example, depending on the context, decisions might be based on analytical or intuitive reasoning (Hammond, Hamm, Grassia, & Pearson, 1987; Vinitzky & Mazursky, 2011). According to the dual system model (Dhar & Gorlin, 2013), people engage in either intuition-based processing, referred as System I, or reason-based processing, called System II, to construct their preferences, and these two systems are interactive. When System I, with its focus on surface properties, does not generate a strong preference, System II initiates to guide decision making. However, when System I generates a strong, intuition-based decision, System II reacts to that decision by endorsing, modifying, or rejecting it. Such System II assessments are subject to biases and often confirm the intuition-based decision. This study reasons that this model also can explain how people adopt decision strategies when making choices among options advertised in magazine ads or featured on shopping websites. Specifically, extending Dhar and Gorlin's (2013) work, this study proposes that System I is more likely to produce strong preferences in response to nonattribute elements, such as background pictures in advertising, rather than product attributes. Magazine ads with their common feature of attractive pictures provide a salient property that can trigger a strong, intuition-based preference (System I) and get confirmed by System II. Therefore, a product with

performance inferior to competitors may have a better chance of being selected in a magazine ad context if it is advertised with an attractive picture.

As a foundational idea, this study predicts that cognitive processes, including decision making, are confined by the structure of the environment; therefore, taking a thorough canvass of the structure of the environment (i.e., background pictures in magazine ads and product pages in online stores) is a critical first step (Brunswick, 1956; Dhimi, Hertwig, & Hoffrage, 2004). An initial pilot study establishes that the majority of magazine ads feature dominant pictures, whereas the majority of product pages in e-stores do not. Next, Study 1 tests preference construction across these two media contexts by asking consumers to make choices among product options advertised in a magazine or presented in an e-store. Compared with those in the e-store condition, people in the magazine condition are more likely to rely on pictures in their decision making; compared with those in the magazine condition, those in the e-store condition are more likely to rely on product attributes to make choices. Analyses of the reasons they provide for their choices confirm the processing difference. Due to the decision strategies they adopt, participants in the e-store condition choose the best option, whereas more participants in the magazine condition choose the worst option with the most attractive pictures. Study 2, which manipulates the presence of positive product attributes and attractive pictures in a print ad context, confirms that magazine ads with attractive pictures trigger picture-dominant, intuition-based processing, not product-dominant processing.

1.1 | Decision making under bounded rationality

Across vast consumer behavior research into consumer decision processes, Shafer (1986) argues that one of the most fundamental findings is that decisions are not invariant. For example, Payne (1982) proposes that people are contingent decision makers, and Simonson and Tversky (1992) challenge the assumption that people select the option with maximum value, independent of the context. Simonson (2007) further notes that researchers offer some consensus that preference is constructed and contingent on choice contexts. People tend to adopt different strategies in various contexts, prompting decision variance, to the extent that the strategy selected in each context can even lead to preference reversals (Khan, Zhu, & Kalra, 2011; Payne, Bettman, & Johnson, 1992; Roy & Ng, 2012; Slovic, 1995).

Two frameworks attempt to explain why people are not invariant decision makers: accuracy effort and choice goals. The accuracy effort framework suggests that decision behaviors are driven by conflicting goals, namely, to maximize the accuracy of the choice and to minimize the cognitive efforts involved in making the choice (Payne, 1982; Payne et al., 1992). Each decision strategy entails different levels of accuracy and effort associated with reaching a decision, and accuracy and effort trade off with each other. Some choice contexts may encourage a strategy that strives for accuracy but demands high cognitive efforts; other choice contexts encourage a strategy oriented toward low cognitive efforts, but that also leads to lower accuracy. In parallel, the choice goals framework proposes that people hold two more goals: to minimize negative emotion when

making a choice and to maximize the ease of justifying their choice (Bettman et al., 1998). Decision contexts affect these goals and thus the decision strategies adopted.

Prior research has identified some common decision strategies, which can be categorized as either compensatory or noncompensatory. Compensatory strategies, which focus on alternatives, consider information about all attributes and trade off between the positive and negative aspects of each attribute for each alternative (Bettman et al., 1998). Therefore, they confront conflict and consume substantial cognitive capacity. The weighted adding strategy (WAS) and equal weight adding strategy (EAS) are two typical compensatory strategies. When adopting the WAS, people derive scores for each alternative by multiplying the relative importance (weight) and values of each attribute for a particular alternative. With the EAS, they derive scores for each alternative by averaging the performance of each attribute, treating the importance (weight) of each attribute as equal. Because EAS does not consider the relative importance of each attribute, it is less effortful than WAS.

Noncompensatory strategies instead are attribute centered, such that they circumvent trade-offs among the attributes of each alternative (Payne et al., 1992). For example, with a lexicographic strategy (LS; Tversky, 1969), the decision maker selects the option that performs best on the most important attribute, without considering performance on other, less important attributes. Because noncompensatory strategies do not involve trade-offs, they are less cognitively taxing; using LS to construct preferences is less effortful than adopting WAS or EAS.

In situations that activate high accuracy or low effort goals, people adopt different decision strategies, because each strategy involves unique computational and processing efforts and offers different levels of accuracy. Payne, Bettman, and Johnson (1990) analyze elementary information processes (EIP) for each strategy to demonstrate the differences among them, in terms of their required cognitive efforts. In decision contexts, EIP generally entail "reading an item of information, comparing two items of information, multiplying or adding items of information, eliminating items of information" (Bettman et al., 1998, p. 194). From these analyses, the authors find that WAS requires the most EIP, followed by EAS and then LS. That is, noncompensatory strategies generally involve fewer EIP and are cognitively easier than compensatory strategies (Bettman et al., 1998; Payne et al., 1992; Payne, Bettman, & Johnson, 1993). Moreover, the strategies that involve the most EIP generate the most accurate decisions: WAS tends to be more accurate than EAS, which is more accurate than LS.

Payne et al. (1992) also identify variations in tasks and contexts as possible determinants of decision inconsistency. In their definition, task variations usually pertain to decision characteristics (e.g., evaluations and choices), whereas context variations refer to the performance of the alternatives in the consideration set. This study argues that salient cues in a decision context could shift decision strategies and result in decision variation. Saliency, a property of stimuli in context, is the degree to which a stimulus stands out from its context (Fiske & Taylor, 1984). When a cue is salient, such as a dominant picture in an advertisement, people tend to attend to it, even if it is less important than other, less salient cues. The dual system

theory of preference construction likely can shed further light on the potential role of background pictures in terms of shifting people's decision strategies.

1.2 | Decision making according to dual system theory

A recent theoretical advance in decision science is the emergence of dual process models that categorize preference construction processes as based in intuition or reason (Kahneman, 2003; Kahneman & Frederick, 2002), also referred to as System I and System II (Stanovich & West, 2000). The former refers to a quick, heuristic-based decision process that is spontaneous, operates through automatic association, and exerts minimal demands on working memory (Kahneman, 2003; Kahneman & Frederick, 2002). The latter involves deliberation, is effortful, and taxes cognitive capacity (Kahneman, 2003; Kahneman & Frederick, 2002). Whereas System I tends to focus on perceptible attributes and the surface properties of objects, System II attends to nonsensory or numerical attributes (Dhar & Gorlin, 2013; Hammond et al., 1987). In addition, the two systems work simultaneously and are interactive (Aydinli, Bertini, & Lambrecht, 2014; Dhar & Gorlin, 2013). By integrating them, Kahneman and Frederick (2002) propose that System I, which tends to be spontaneous, offers an initial, intuitive answer, and then System II steps in to assess that answer by endorsing, modifying, or rejecting it. However, the intuition-based answer generated by System I may come under only careless scrutiny by System II and be accepted without much resistance, because extensive, reason-based elaboration occurs only when decision makers have strong motivation and sufficient ability (Kahneman, 2003).

Extending this idea to decision making, Dhar and Gorlin (2013) propose a dual system framework to clarify the interaction of the two systems. That is, though the two systems interact, some preferences derive primarily from intuitive processing, and others are determined dominantly by deliberative processing. If System I "generates a strong intuition in favor of an option" (Dhar & Gorlin, 2013, p. 531), preferences should reflect this intuitive processing, because such strong preferences are unlikely to be rejected by System II. If a person strongly "feels" that an option is superior, without effortful comparisons, this strong, intuition-based preference is not only unlikely to be challenged by System II but even can be readily confirmed by it. Even if System II gets activated, it remains susceptible to bias and might involve only selective processing of confirmatory information. In these conditions, preference is determined by System I processing. However, if System I does not generate a strong intuition in favor of any options, preference likely is determined by deliberative processing. That is, only when no strong, intuition-based preference arises does System II lead to the exercise of cognitive efforts to construct preferences through evaluations of the attributes of each option. In such cases, preference depends mainly on System II processing.

In elaborating on this framework, Dhar and Gorlin (2013) seek to show how System I can generate a strong intuition in favor of an option when it features a salient product attribute. However, according to Kahneman (2003), System I is perceptual and relies on

assessments of physical properties. Therefore, extending Dhar and Gorlin, this study reasons that System I actually is more likely to produce strong preferences in response to nonattribute elements, such as background pictures in advertising, rather than product attributes. In line with the dual system framework, when people process information in magazine advertisements, System I should pick up salient cues such as background pictures; to the extent these pictures induce a strong, intuition-based preference, which is unlikely to be challenged by System II, those pictures can determine preferences. Even if a product does not perform better on important attributes compared with other options in the context, if its ad features an attractive picture and leads to strong preferences, decision makers may not contest the preference with System II processes.

This framework also might explain the different decision strategies that people adopt when browsing online stores rather than reading magazine ads with dominant pictures (i.e., pictorial ads). Product pages in an online store usually focus on product attributes and lack dominant-background pictures. Therefore, when comparing product options in this context, System I probably does not generate strong preferences; instead, preferences are more likely to derive from System II. This decision making should be more rational, computational, and analytical. For example, Frederick (2002, p. 548) explains that preferences are mainly affected by System II "when a decision maker is presented with a matrix of numbers summarizing the attributes of six different apartments ... no intuitive computations generate an impression of which option is best." In contrast, magazine ads featuring attractive or affect-laden background pictures offer opportunities for intuition-based processing, such that they should engage consumers in more intuitive, picture-based decision strategies. Because e-stores usually feature product attributes without salient visual cues, they should engage consumers in elaborative, attribute-based decision strategies to a greater extent.

H1 *Pictorial ads are (a) less likely to encourage attribute-based decision making and (b) more likely to encourage picture-based decision making than are product pages in online stores.*

One way to understand which decision-making strategies consumers adopt is to probe the reasons for their choices. Prior research suggests that people construct reasons to resolve their choice conflicts (Shafir, Simonson, & Tversky, 1993). This idea resonates with the choice goal framework (Bettman et al., 1998), which argues that for decision makers, justification is an important goal, so people seek reasons to justify their choices. According to Shafir et al. (1993), reason-based analyses offer two advantages in this sense. First, people's reasons reveal how they have evaluated the options and constructed their choices. Second, reasons usually guide choices, which provide a window into people's decision-making processes. Exploring the reasons that consumers provide for a choice thus should reveal their processing differences. For example, if people actually rely on background pictures or product attributes to make their judgments in the contexts of magazine reading or e-store browsing, they should be more likely to use those pictures or product attributes to justify their product choices. Therefore,

H2 Participants reading pictorial ads are (a) less likely to use product attributes to justify their choices and (b) more likely to use pictures to justify their choices than are those browsing e-stores.

Thus H1 and H2 explore decision-making processes in different contexts. If consumers adopt different decision-making strategies, they also might select different product options, so H3 also considers the choice outcomes that result from different processing strategies. As argued previously, product pages in online stores lack salient background cues such as affect-laden or valenced background pictures; therefore, consumers' preferences are determined mainly by their elaborative System II processing. When people engage in System II processing, characterized by rational computations and analyses, their preferences likely are driven by *compensatory strategies*, so they probably choose the option with the best overall performance. Pictorial ads instead are less likely to encourage reason-based, capacity-consuming compensatory strategies and might not lead to the selection of the best performing option.

H3 Compared with product pages in e-stores, pictorial ads are less likely to encourage consumers to adopt compensatory strategies in their product selection, leaving them less likely to select products with the best overall performance.

2 | PILOT STUDY

2.1 | Objectives

The central idea underlying the comparison between magazine ads and online stores is that consumers' decisions depend on the differences in these contexts, such as salient background pictures. The development of the hypotheses thus relies on an assumption that when product attributes are introduced in magazine ads, dominant-background pictures appear simultaneously, whereas when product features are introduced in online stores, dominant-background pictures are absent. The pilot study tested this assumption.

2.2 | Targets and procedures

The content analyses focused on product advertisements in five magazines and product pages in five generic category (rather than specialty) e-stores, to test for the presence of dominant pictures. The magazines were the top three, in terms of circulation, in the markets where the study was conducted (*Business Today*, *Business Weekly*, and *China Times Weekly*) and the most read magazine from each of the four most popular magazine categories: business (*Business Today*), women's fashion (*VIVI*), men's fashion (*For Him Magazine*), and lifestyle (*China Times Weekly*; Ministry of Culture, 2012). Because two top circulation magazines also happened to be the top-circulated magazines in the business and lifestyle category, five magazines were analyzed in total. The five e-stores considered were the top generic category e-stores: Ruten (ruten.com.tw), PChome Online (pchome.com.tw), momo (www.momoshop.com.tw), Books (books.com.tw), and Gohappy (<http://www.gohappy.com.tw/>; Chen, Lo, & Yang, 2012).

For the five magazines, all ads in the last issue in 2012 were analyzed, including ads for facial lotion, which served as the target product in Study 1. The shopping websites featured dozens of product categories and tens of thousands of product pages, but the presentations on these product pages did not vary notably across product categories. To make the analysis feasible, the product pages generated by a keyword search for "facial lotion" on December 31, 2012, entered the analysis, because Study 1 focused on facial lotion.

Two coders followed the procedures suggested by Krippendorff (2004) and Neuendorf (2002): (a) define each variable; (b) identify levels and subcategories of each variable that are mutually exclusive; (c) develop coding schemes and coding forms; (d) train coders; (e) establish pilot reliability using magazines or e-stores not from the sampled sets; (f) have the coders code one-fifth of the sample and calculate intercoder reliability (which was satisfactory, with percentage agreement from 96.24 to 100; Holsti's [1969] measure = .95-1; Cohen's [1960] $\kappa = .84-1$; Krippendorff's [1970] $\alpha = .84-1$); and (g) have the coders split up and each code two-fifths of the remaining sample.

They first coded the presence of dominant-background pictures. When such pictures were present, the coders classified them into three categories: (a) dominant pictures with no models, (b) dominant pictures with models, and (c) model-dominant pictures. When they were absent, the coders were assigned to either a white ad or single-color, plain-background ad. Each ad thus represented one of the following categories: no dominant pictures with a white background, no dominant pictures with a single-color background, dominant pictures with no models, dominant pictures with models, or model-dominant pictures.

2.3 | Results and discussion

The results of the pilot study (see Table 1) indicated that among all the ads analyzed ($N = 237$), most magazine ads featured dominant-background pictures (90.72%), as did most ads for facial lotion (75.00%). In clear contrast, among the product pages analyzed ($N = 847$), only 22.08% featured dominant pictures. The pictures on the product pages were relatively small and less salient than were those in magazine ads. The distributions of the five types of background pictures in magazine ads and product pages in online stores, as specified in Table 1, also differed significantly, $\chi^2(4, N = 1,084) = 429.42, p < .01$. These findings thus supported the assumptions underlying the hypotheses and justified the importance of exploring how the presence or absence of dominant and salient pictures in magazine or e-store contexts alters product choice strategies. Therefore, Study 1 tested the hypotheses.

3 | STUDY 1

3.1 | Design

Study 1 featured a Media Type (magazines vs. shopping websites) \times Product Options (three brands, varying in their product attributes) two-factor mixed design. The former was a between-subjects factor, whereas the latter was a within-subjects factor.

TABLE 1 Coding results

Background type	Magazines (N = 237)				e-Stores (N = 847)	
	All ads (N = 237)		Facial lotion ads (N = 8)		Product pages	Percentage
No dominant pictures, white background	5	2.11	0	0	625	73.79
No dominant pictures, single-color background	17	7.17	2	25.00	35	4.13
Subtotal	22	9.28	2	25.00	660	77.92
Dominant pictures without models	82	34.60	1	12.50	84	9.92
Dominant pictures with models	95	40.09	2	25.00	21	2.48
Model-dominant pictures	38	16.03	3	37.50	82	9.68
Subtotal	215	90.72	6	75.00	187	22.08
Total	237	1	8	1	847	100

Note. The distributions of the five types of background pictures in magazine ads and product pages in online stores differed significantly, $\chi^2(4, N = 1,084) = 429.42, p < .01$.

3.2 | Participants and procedures

The study was conducted with students of a large university in East Asia. The materials and measures were in Chinese; they had been translated following Brislin's (1987) translation and back-translation procedure. The respondents were paid for their participation.

An e-mail invitation sent to all undergraduate students registered with the university stated the purpose of the study (i.e., to understand how people comprehend media content) and listed various times and places for the sessions. Because this study involved participants searching for a cosmetic product, only women were recruited. Interested potential participants signed up online and responded to a list of questions, including which attributes they considered important when they chose facial lotion. The choice to use facial lotion as the target product stemmed from the recognition that cosmetics represented the most advertised product category in magazines in 2011 (Media Agency Association, 2012).

A pretest ($N = 40$) identified four attributes of facial lotion that differed significantly in their importance for consumers, in the following order: whitening, moisture, minimizing pores, and reducing dark eye pouches. This importance ranking was verified in the main study, as reported subsequently. Ads were created for three products, and they reflected this ranking of attribute importance by varying product performance, as explained in detail in the stimuli section. Only the participants whose importance ranking matched this order received an invitation to complete the study. When they arrived in a lab ($N = 169$), they were randomly assigned to either the e-store condition ($N = 87$) or the magazine condition ($N = 82$).

The persons assigned to the magazine condition received instructions indicating that they would be reading a magazine segment that included a couple of ads for facial lotions that were priced similarly. As a token of appreciation for their participation, they would enter a drawing to win a gift, namely, free facial lotion. They therefore would need to indicate which of the advertised brands they preferred as their gift for the drawing. Next, they read a magazine segment with a cover page (p. 1), editorial page (p. 2), target ad 1 (p. 3), magazine article (p. 4), target ad 2 (p. 5), target ad 3 (p. 6), filler ad 1 (p. 7), and filler ad 2 (p. 8; see Appendix A). After reading the ad, they selected their preferred product for the gift drawing and provided reasons for their selection.

Those assigned to the e-store condition instead browsed a shopping website that featured a variety of product categories. The

experimental setup indicated that, to reduce the length of the session, each participant would be asked to provide opinions about only one product category. The experiment indicated they had been randomly selected to shop for facial lotion, so only pages pertinent to that category were active. They could view the available products by clicking the facial lotion category link on the home page (see Appendix B). This click took them to a facial lotion category page, which displayed all the available products; they also could click each product to see what it offered, similar to real e-stores. In this case, the product features for the three options were not presented simultaneously. Again, these participants were told that as a token of appreciation for their participation, they would enter a gift drawing and needed to select one of the featured brands at the end of their session. After browsing the website, they chose the product and provided reasons for their selection.

Finally, participants in both sessions drew a lot from a box. Ten bottles of facial lotion were available as gifts. The subsequent debriefing explained that the three brands were fictitious, and the selection process aimed to involve them in a decision-making task. The alternative brands then were provided as gifts.

3.3 | Stimuli

The items in these experiments used 7-point Likert scales, except as specified, and the participants' responses to the scale items were averaged, such that higher ratings indicated a greater degree or higher level.

3.3.1 | Bottle selection

A pretest ($N = 50$ women) indicated three neutral-looking bottles, which were not likely to trigger strong intuition-based preferences and did not differ notably in terms of the liking they invoked. The pretest asked participants to rate the degree to which they liked a list of bottles, and the selected bottles were those that did not vary significantly on this measure ($M_s = 3.99, 4.17, \text{ and } 4.19$; no paired comparisons were significant, all $t_s < 1.19$, all $p_s > .24$). The means were not significantly different from the midpoint of the scale (4) either ($t_s < 1.33, p_s > .19$), so they appeared neutral for liking and seemed unlikely to trigger strong intuition-based preference, which could have interfered with the effects of the pictures.

3.3.2 | Brand name selection

Another pretest ($N = 54$ women) served to identify three neutral brand names, which were not likely to trigger strong intuition-based preferences and did not differ in liking. The pretest asked participants to rate the degree to which they liked a list of brand names; their ratings facilitated selections of three brand names (Aimer, Virtuous, and Rencontre) that did not vary in liking ($M_s = 4.28, 4.20,$ and 4.22 ; no paired comparisons were significant, all $t_s < 0.78$, all $p_s > .44$). Because this study explored decision construction strategies, it was necessary to use fictitious brands, toward which consumers could not have formed preferences or evaluations. Moreover, the means did not differ significantly from the midpoint of the scale (4; $t_s < 1.70$, $p_s > .10$), so the names were neutral and unlikely to generate strong intuition-based preference or interfere with the influences of the pictures.

3.3.3 | Attribute arrangement

The attributes were arranged for the three brands such that when people engaged in compensatory strategies (WAS or EAS), they would select Brand 1 (Aimer), whereas if they engaged in noncompensatory strategies, they would select Brand 2 (Virtuous; see Tables 2 and 3). Brand 3 (Rencontre) was the worst option, which should not be chosen whether participants engaged in compensatory or noncompensatory strategies.

To present the relative performance of the three brands explicitly, performance appeared as specific numbers or percentages. According to prior research, when attribute values appear in numbers, rather than words, it encourages compensatory strategies (Stone & Schkade, 1991). Because the relative performance of an attribute across the three alternatives appeared in numerical form, which would facilitate compensatory strategies, if magazine ads still fail to trigger compensatory strategies, the pictures must dominate decision making.

In the magazine condition, the three ads (on pp. 3, 5, and 6) never appeared simultaneously; consumers had to turn the pages to compare them. Similarly, in the e-store condition, product information was not presented simultaneously, because for each brand, it was available only after participants clicked on the brand image. Therefore, the two media conditions did not differ in their simultaneity of information, which can facilitate decision making (Wan, Hong, & Sternthal, 2009). Moreover, the order of the three products was randomized.

3.3.4 | Picture arrangement

A pretest ($N = 99$ women) helped select three background pictures that differed significantly in liking, $F(2, 97) = 14.28$, $p < .01$, Cohen's $d = 4.16$. The best liked background picture ($M = 5.06$, $SD = 1.06$) then was inserted into the Rencontre ad, the moderately liked picture ($M = 4.12$, $SD = 1.38$) was used for Aimer, and the least liked picture ($M = 3.28$, $SD = 1.56$) appeared in the Virtuous ad. The difference between each pair was significant: Rencontre versus Aimer, $F(1, 62) = 8.65$, $p < .01$, Cohen's $d = 0.77$; Rencontre versus Virtuous, $F(1, 68) = 28.51$, $p < .01$, Cohen's $d = 1.32$; Aimer versus Virtuous, $F(1, 65) = 5.24$, $p = .03$, Cohen's $d = 0.57$.

3.4 | Independent variable: Attribute importance

As detailed previously, when participants signed up for the study, they rated the degree of importance of four attributes for facial lotion. As expected, repeated-measures analyses of variance showed that the four attributes differed in their importance, $F(3, 165) = 32.22$, $p < .01$, Cohen's $d = 3.50$, in the expected order: skin lightening ($M = 6.22$, $SD = 0.90$), moisture lock in ($M = 5.93$, $SD = 1.01$), minimizing pores ($M = 5.48$, $SD = 1.30$), and reducing dark circles around eyes ($M = 5.14$, $SD = 1.47$). Moreover, the linear contrast was significant, $F(3, 166) = 82.45$, $p < .01$, and the differences between each pair of attributes were significant (all $t_s > 2.72$, all $p_s < .01$).

3.5 | Dependent variables

3.5.1 | Decision orientation: Attribute based versus picture based

Without any existing scales to measure attribute- versus picture-based decisions, this study developed a new scale. Participants thus rated the degree to which two statements, reflecting attribute- or picture-based strategies, respectively, described how they made selections: "When making decisions, I rely on the benefits that the product attributes can bring me" and "When making decisions, I rely on how the picture made me feel." The two items correlated negatively (Pearson's $r = -.18$, $p = .02$).

3.5.2 | Product selection

Participants selected one of the three brands as their potential gift; they also could defer their choice if they found it difficult. One

TABLE 2 Attribute arrangement

	Brand 1	Brand 2	Brand 3
Importance ranking	Aimer	Virtuous	Rencontre
1. Skin lightening	Worst Lightening dark spots by 30%	Best Lightening dark spots by 80%	Moderate Lightening dark spots by 50%
2. Moisture lock in	Better 8 times the ability to lock water	Worse 4 times the ability to lock water	Worse 4 times the ability to lock water
3. Minimizing pores	Better Showing minimized pores within 1 week	Worse Showing minimized pores within 1 month	Worse Showing minimized pores within 1 month
4. Reducing dark circles	Better Getting rid of dark circles around the eyes with 30 ml of L-ascorbic acid	Worse Getting rid of dark circles around the eyes with 10 ml of L-ascorbic acid	Worse Getting rid of dark circles around the eyes with 10 ml of L-ascorbic acid
Picture attractiveness	Moderate	Worst	Best

TABLE 3 Scores from weighted adding and equal weight adding strategies

Brands	Product attributes			Decision making strategies	
	Skin lightening	Moisture lock in	Minimizing pores	Reducing dark eye circles	Scores from equal weight adding strategy ^c
Average importance rating	6.22	5.93	5.48	5.14	
Aimer	Original claims by 30% .375 ^a	8 times the ability to lock water 1	Minimizing pores within 1 week 1	30 ml of L-ascorbic acid 1	18.88 = .375 × 6.22 + 1 × 5.93 + 1 × 5.48 + 1 × 5.14 .84 = (.375 + 1 + 1 + 1)/4
Virtuous	Original claims by 80% 1	4 times the ability to lock water .50	Minimizing pores within 1 month .25	10 ml of L-ascorbic acid .33	12.25 = 1 × 6.22 + .5 × 5.93 + .25 × 5.48 + .33 × 5.14 .52 = (1 + .5 + .25 + .33)/4
Rencontre	Original claims by 50% .625	4 times the ability to lock water .50	Minimizing pores within 1 month .25	10 ml of L-ascorbic acid .33	9.92 = .625 × 6.22 + .50 × 5.93 + .25 × 5.48 + .33 × 5.14 .43 = (.625 + .5 + .25 + .33)/4
Relative scores					

Note.

^aFor each attribute, the brand with the best performance was assigned a score of 1, and the scores of the other two brands varied as a function of their performance relative to the best product. Therefore, for skin whitening, Virtuous offered the best performance and took a score of 1. Aimer's and Rencontre's performance was .375 of Virtuous's (.30/.80 = .375), so they were assigned scores of .375.

^bThese scores reflected the following formula: (Importance of Whitening × Performance Score on This Attribute) + (Importance of Moisture × Performance Score on This Attribute) + (Importance of Minimizing Pores × Performance Score on This Attribute) + (Reducing Dark Eye Pouches × Performance Score on This Attribute).

^cThe scores for each brand were the average performance of the product on each attribute.

participant in the online condition deferred the choice (1.15%); seven participants in the magazine ad condition did so (8.54%).

3.5.3 | Reasons for choice

After making their choices, participants wrote down why they made it. Two coders coded each participant's reasons into three categories: related to the product attribute, not related to the product attribute, or mixed. The first category pertained to product attributes and their benefits (e.g., "Its whitening effect is impressive"). The second category included references to (1) the background picture ("I like the red color, which makes the advertised product elegant"), (2) the appearance of the bottles ("I chose the brand because its bottle looks classic"), or (3) the layout and copy ("I like the layout of the ad"). If respondents listed reasons that related to both product attributes and the ad or web page, their reasons were coded as mixed (e.g., "The color of the ad first attracted my attention, and then I examined its claims and found they met my needs"). Both coders coded all the responses, and their intercoder reliability was satisfactory (agreement = 98.02%, or 3/152; Krippendorff's [1970] $\alpha = .96$).

3.6 | Results and analyses

As predicted by H1a, compared with those in the magazine condition ($M = 5.63, SD = 1.20$), participants in the e-store condition ($M = 5.98, SD = 1.03$) were more likely to engage in attribute-based processing, $F(1, 167) = 3.97, p = .05$, Cohen's $d = 0.31$. Consistent with the predictions of H1b, compared with those in the e-store condition ($M = 4.38, SD = 1.47$), participants in the magazine condition ($M = 5.09, SD = 1.34$) were more likely to engage in picture-based processing, $F(1, 167) = 10.89, p < .01$, Cohen's $d = 0.46$.

The reasons for participants' selection, as listed in Table 4, supported H2. In particular, among those who provided reasons for their choice ($N = 152$), those reasons varied according to whether the participants had been assigned to the e-store or magazine condition, $\chi^2(2, N = 152) = 30.67, p < .01$. As H2a predicted (Table 4, top panel), participants in the e-store condition were more likely to rely solely on product attributes and their functions to construct their preferences (77.21%) than were those in the magazine ad condition (34.25%). Consistent with H2b, those in the magazine ad condition were more likely to rely solely on ad or web page elements (e.g., pictures; 43.83%) than were those in the e-store condition (10.13%).

In addition, the ads or web pages contained pictures, bottles, and copy. In analyses focused solely on the presence of picture-based reasoning, the differences again were significant, $\chi^2(1, N = 169) = 50.26, p < .01$ (Table 4, middle panel). Almost half of those in the magazine ad condition explicitly noted that they liked the ad picture, to explain their brand selection. In contrast, likely because the pretest led to the selection of neutral bottles, which did not encourage strong intuition-based preferences, participants in the two conditions did not differ in their bottle-based reasons, $\chi^2(1, N = 169) = .01, p = .56$ (Table 4, bottom panel). The reported differences in ad-based reasoning thus were driven mainly by picture-based reasoning.

As H3 predicted, participants in the e-store and magazine conditions made different choices, $\chi^2(3, N = 169) = 8.32, p = .04$ (see

TABLE 4 Reasons provided for product choices

		Attributes	Nonattributes	Both	Total
e-Stores	Count	61	8	10	79 ^a
	%	77.21	10.13	12.66	100.0
Magazines	Count	25	32	16	73 ^a
	%	34.25	43.83	21.92	100.0
Total	Count	86	40	26	152
	%	56.58	26.31	17.11	100.0
		No mention of pictures	Pictures as reasons	Total	
e-Stores	Count	87 ^b	0	87	
	%	100.00	0.00	100.00	
Magazines	Count	45 ^b	37	82	
	%	54.88	45.12	100.00	
Total	Count	132	37	169	
	%	78.11	21.89	100.00	
		No mention of bottles	Bottles as reasons	Total	
e-Stores	Count	74 ^c	13	87	
	%	85.06	14.94	100.00	
Magazines	Count	70 ^c	12	82	
	%	85.37	14.63	100.00	
Total	Count	144	25	169	
	%	85.21	14.79	100.00	

Note.

^aEight respondents in the e-stores condition and nine respondents in the magazines condition did not list any reasons for their choice.

^bRespondents who did not list any reasons for their choice were counted in the “no mention of pictures” category.

^cRespondents who did not list any reasons for their choice were counted in the “no mention of bottles” category.

Table 5). More participants in the e-store condition selected Aimer ($N = 40$, 45.98%), the best option, than in the magazine condition ($N = 28$, 34.14%), which indicated they were more likely to engage in compensatory decision strategies. Both Aimer and Virtuous, the two superior options, were more likely to be selected in the e-store condition than in the magazine ad condition. In contrast, Rencontre, the worst option, was more likely to be selected in the magazine ad condition (26/45, 57.78%) than in the e-store condition (19/45, 42.22%).

Table 6 contains the reasons provided for the selection of each brand in the e-store and magazine conditions. Analyses of the reasons in the e-store condition suggested that regardless of the brands chosen, most e-store shoppers made their decision on the basis of the benefits provided by the product attributes, with no significant difference across brands, $\chi^2(4, N = 79) = 8.45, p = .08$. Likely because they relied on product attribute-based, rational strategies, most

participants in this condition selected the best option (45.98%, Table 5). However, even in the e-store condition, 21.84% still selected the worst performance option, which seems to represent an irrational choice. However, the reasons provided by the e-store participants who selected this option indicated that their choices actually were based on product attributes (72.22%). In particular, they selected the inferior options because they counterargued the strong claims in some ads. For example, some participants considered whitening the most important product feature, and in comparing the three brands, they reasoned that Virtuous, the best product, might be exaggerating its effects. Therefore, they chose Rencontre, which offered the worst overall performance but modest performance in terms of whitening. Their selection of the worst option thus still reflected (a form of) rational reasoning.

In contrast, the reasons provided by participants in the magazine condition revealed that the selection of different brands stemmed from various reasons, $\chi^2(4, N = 73) = 14.06, p < .01$ (Table 6). As noted, those in the magazine condition were more likely to choose Aimer (34.14%) or Rencontre (31.71%) than Virtuous (25.61%). For Aimer, which had the best overall product performance and a moderately attractive picture, the reasons still tended to relate to the ad (42.86%; e.g., “the red background picture is impressive” and “red color suggests mature”) instead of attribute-based justifications (32.14%). The selection of Rencontre, the worst option with the most attractive picture, also resulted from ad-based reasoning (66.67%) instead of attribute-based reasoning (12.50%). Some example reasons included “the green color is soothing” and “the layout and color makes me feel relaxed.” That is, most of the participants who selected this worst option pointed to the ad to justify their selection. The only exception to this trend was Virtuous, for which participants listed more attribute-related reasons (61.90%) than ad-related reasons (19.05%). A majority (13/21, 61.90%) further noted that they chose Virtuous because of its effective whitening, which represented the most important attribute to them. That is, they engaged in less effortful noncompensatory decision strategies (i.e., LS) rather than compensatory strategies, which likely would have led them to select Aimer.

In the analysis that distinguished different types of ad elements, even though magazine viewers' selections of the three products were justified by different degrees of consideration of ad pictures (Rencontre, followed by Aimer and then Virtuous), the difference only approached significance, $\chi^2(8, N = 73) = 14.87, p = .06$. Among the participants in the magazine condition who chose the worst option Virtuous, half (50.0%) indicated that their choice was driven by the attractive picture.

TABLE 5 Product choices across conditions

		Aimer (best using compensatory strategies)	Virtuous (best using noncompensatory strategies)	Rencontre (with most attractive pictures)	Deferral	Total
e-Stores	Count	40	27	19	1	87
	%	45.98	31.03	21.84	1.15	100.00
Magazines	Count	28	21	26	7	82
	%	34.14	25.61	31.71	8.54	100.00
Total	Count	68	48	45	8	169
	%	40.24	28.40	26.63	4.73	100.00

TABLE 6 Reasons provided for specific product choices

		e-Store					
		Attributes	Nonattributes	Both	Total		
Aimer	Count	27	6	4	37		
	%	72.97	16.22	10.81	100.00		
Virtuous	Count	21	2	1	24		
	% ^b	87.50	8.33	4.17	100.00		
Recontre	Count	13	0	5	18		
	% ^b	72.22	0.00	27.78	100.00		
Total	Count	61	8	10	79		
	%	77.21	10.13	12.66	100.00		
		Magazine					
		Attributes	Nonattributes	Both	Total		
Aimer	Count	9	12	7	28		
	%	32.14	42.86	25.00	100.00		
Virtuous	Count	13	4	4	21		
	%	61.90	19.05	19.05	100.00		
Recontre	Count	3	16	5	24		
	%	12.50	66.67	20.83	100.00		
Total	Count	25	32	16	73		
	%	34.25	43.83	21.92	100.00		
		Products	Products and pictures	Products and other cues	Pictures only	Other cues	Total
Aimer	Count	9	5	2	9	3	28
	%	32.14	17.86	7.14	32.14	10.72	100.00
Virtuous	Count	13	3	1	4	0	21
	%	61.90	14.29	4.76	19.05	0.00	100.00
Recontre	Count	3	4	1	12	4	24
	%	12.50	16.67	4.16	50.00	16.67	100.00
Total	Count	25	12	4	25	7	73
	%	34.25	16.44	5.48	34.24	9.59	100.00

3.7 | Discussion

System I processing should be more unconscious (Hammond et al., 1987), such that participants might not be aware that their decisions have been guided by their perceptions of pictures. Moreover, if they consider picture-based preferences less rational, they might be reluctant to justify their choice solely on the basis of the pictures. Yet even with these constraints, the Study 1 findings still support the hypotheses. Compared with e-store participants, respondents in the magazine condition were more likely to agree that they relied on pictures in their preference construction and less likely to agree that they relied on product attributes or functions in their preference construction.

Although the products in the two conditions offered the same features, participants in the two conditions made different choices; compared with magazine participants, e-store participants were more likely to select the best option. Yet compared with e-store participants, magazine participants were more likely to select the worst option, because of its attractive pictures. Perhaps most important, a greater percentage of magazine participants specified that their decision derived from their liking of the ad pictures, especially those who selected the worst option.

To demonstrate that magazine ads encourage picture-dominant processing, it also is important to manipulate ad content. To address this point, Study 2 included three ad conditions: the presence of attractive pictures without product attributes (picture-dominant condition), the presence of positive product attributes with plain-background pictures (attribute-dominant condition), and the

simultaneous presence of both attractive pictures and positive attributes (picture-attribute condition). In the picture-attribute condition, the pictures should first encourage System I processing, leading to strong, intuition-based preferences; and then System II should selectively process product information that confirms, but does not enhance, the intuition-based preference. If salient pictures in magazine ads encourage picture-based processing, the picture-attribute condition should generate more favorable attitudes than the attribute-dominant condition, because it features attractive pictures. In contrast, the picture-attribute condition should not generate different brand attitudes than those prompted by the picture-dominant condition, because they share the same attractive pictures.

H4 *The picture-attribute and picture-dominant ads generate more favorable brand attitudes than does the attribute-dominant ad.*

Moreover, the underlying assumption for Study 2 is that System I focuses on physical properties and applies a relevant heuristic to lead to evaluations. Therefore, consumers seemingly should first assess whether the pictures are pretty and then apply a heuristic (e.g., if the pictures are pretty, the advertised products must be good) to evaluate the brand. Study 2 tests for this specific mediation process, using picture attractiveness as a mediator in the brand evaluation process.

H5 *Picture attractiveness mediates the relationship between ad type (picture-dominant ad, attribute-dominant ad, or picture-attribute ad) and brand attitudes.*

Finally, Study 2 includes both high- and low-involvement products, to demonstrate whether the picture-dominant preference construction phenomenon is limited to situations in which people are highly involved with the choice, as in Study 1. Whereas prior research has presented participants with only one or two target ads, without editorial context (e.g., Bower & Landreth, 2001), for Study 2, the target ads were embedded in a magazine segment, similar to the context in which people would be exposed to magazine ads in the real world.

4 | STUDY 2

4.1 | Design

Study 2 featured an Ad Type \times Product Type, two-factor mixed design. The former was a between-subjects factor, with three levels: the presence of attractive pictures without product attributes (picture-dominant condition), the presence of positive product attributes with plain-background pictures (attribute-dominant condition), and the simultaneous presence of both attractive pictures and positive attributes (picture-attribute condition). The latter was a within-subjects factor, with two levels: high- and low-involvement products.

4.2 | Stimuli

4.2.1 | Products

A pretest ($N = 20$) supported the selection of a high-involvement (facial lotion, $M = 5.18$, $SD = 1.27$) and a low-involvement (juice, $M = 3.78$, $SD = 1.08$; $t(19) = 4.05$, $p < .01$) product, according to Laurent and Kapferer's (1985) scale (Cronbach's $\alpha = .88$ for lotion and $.71$ for juice). Three ads were created for each product.

4.2.2 | Attributes

The ad copy for facial lotion addressed its natural elements; the ad copy for juice addressed its natural ingredients (see Appendix C).

4.2.3 | Pictures

A second pretest ($N = 20$) led to the selection of a highly attractive and a less attractive background picture for each product, with one item: "The picture is pretty" (7-point scale). The two attractive pictures ($M_{\text{juice}} = 5.35$, $SD = 1.42$; $M_{\text{lotion}} = 5.05$, $SD = 1.19$) were rated as more attractive than were the two plain pictures ($M_{\text{juice}} = 4.15$, $SD = 1.31$; $M_{\text{lotion}} = 4.25$, $SD = 1.33$; $t_s > 2.37$, $p_s < .03$, Cohen's $d > 0.63$), but the two attractive pictures did not differ in their attractiveness ($t(19) = 1.10$, $p = .29$, Cohen's $d = 0.23$), nor did the two plain pictures ($t(19) = 0.34$, $p = .74$, Cohen's $d = 0.08$). An unrelated product picture would likely distract consumers and reduce their cognitive capacity to process product information (Edell & Staelin, 1983). As a conservative test, the attractive picture for each product thus was tested to ensure it was appropriate for ads promoting the featured product attributes. Appendix C contains all three ads for each product.

4.3 | Participants and procedures

The recruitment procedures were similar to those in Study 1. Because this study involves consumers' responses to facial lotion, a cosmetic

product, only women who did not participate in Study 1 were recruited. One hundred twenty-five college students participated and received payment, as compensation for their time. When the participants arrived at the lab, each received a randomly provided folder that contained instructions and a magazine segment with a cover (p. 1), editorial page (p. 2), magazine article (p. 3), filler ad (p. 4), target ad for the lotion (p. 5), another magazine article (p. 6), target ad for the juice (p. 7), and another filler ad (p. 8; see Appendix D). The instructions asked participants to read the magazine segment as if they were at home. When they finished reading it, they were told that to reduce their participation time, they would be asked to provide their views on either one of two articles or two of the four ads. However, all of them participated in the two-ad conditions and rated their attitudes toward the supposedly randomly selected ads, though they were always the ads for the two target brands.

Because participants only saw one version of the ad for each target product category (lotion or juice), they could not indicate their product selections, as in Study 1. However, prior research demonstrates that brand attitudes have direct impacts on product choices (Biehal, Stephens, & Curio, 1992), so this study explored the participants' brand evaluations.

4.4 | Manipulation checks

4.4.1 | Picture type

Participants rated the degree to which they agreed that "the background picture in the ad is pretty," "the background picture in the ad is appealing," and "the background picture in the ad is beautiful" (Cronbach's $\alpha_s = .93$ for lotion and $.86$ for juice). As expected (see Table 7), (a) the picture in the picture-attribute condition did not generate different ratings from pictures in the picture-dominant condition, (b) the picture in the picture-attribute condition generated higher ratings than pictures in the attribute-dominant condition, and (3) the picture in the picture-dominant condition generated higher ratings than pictures in the attribute-dominant condition. Considering lotion and juice separately, the same patterns emerged. Therefore, the manipulation checks were successful.

4.4.2 | Product type

Participants rated their degree of product involvement using Laurent and Kapferer's (1985) scale (Cronbach's $\alpha_s = .81$ for lotion and $.78$ for juice). As expected, they rated lotion higher than juice ($M_{\text{lotion}} = 4.55$, $SD = 1.09$; $M_{\text{juice}} = 3.87$, $SD = 1.11$; $t(124) = 6.68$, $p < .01$, Cohen's $d = 0.62$).

4.5 | Measurements

4.5.1 | Covariates

Subjective knowledge and *product involvement* were included as covariates. Participants with varying product knowledge may rely on background pictures as judgment inputs to different degrees. Therefore, the participants rated Chang's (2004) subjective knowledge four-item scales (e.g., "I know a lot about [X]," "I would consider myself an expert in terms of my knowledge of [X]," "I know more about [X] than my friends do," and "I usually pay a lot of attention to information

TABLE 7 Picture attractiveness and brand attitudes, Study 2

	Means			Main effects			D vs. A			D vs. P			A vs. P		
	Dual (D)	Attribute (A)	Picture (P)	F	p	d ^a	F	p	d	F	p	d	F	p	d
Picture attractiveness															
Both ads	5.18 (1.23)	4.06 (0.95)	5.33 (0.89)	19.05	.01	2.74	24.43	.01	1.02	.49	.49	.14	31.91	.01	1.38
Lotion ad	5.00 (1.54)	4.01 (1.12)	5.07 (1.37)	11.36	.01	2.25	11.36	.01	0.74	.14	.81	.05	13.10	.01	0.85
Juice ad	5.35 (1.20)	4.12 (1.16)	5.59 (0.88)	22.21	.01	2.48	26.84	.01	1.04	1.03	.31	.23	38.51	.01	1.43
Brand attitudes															
Both ads	4.75 (0.78)	4.47 (0.88)	5.05 (0.70)	6.10	.01	3.00	4.87	.03	.34	1.24	.27	.40	11.80	.01	.73
Lotion ad	4.57 (0.96)	4.28 (0.91)	4.75 (0.96)	3.65	.03	2.97	4.39	.04	.31	.14	.72	.19	6.26	.01	.50
Juice ad	4.91 (0.93)	4.65 (1.10)	5.35 (0.73)	6.38	.01	2.97	4.22	.04	.26	1.82	.18	.53	12.55	.01	.75

Note. Bold face indicates that the effects are predicted to be significant.

^aCohen's *d*.

about [X]"; Cronbach's $\alpha = .91$ for lotion and $.96$ for juice). Even for the same products, different participants also may vary in their involvement levels, so *product involvement*, being rated on Laurent and Kapferer's (1985) scale, provides another covariate (Cronbach's $\alpha = .86$ for lotion and $.80$ for juice).

4.5.2 | Dependent variables: Brand attitudes

Participants rated their attitudes toward the advertised brand using Holbrook and Batra's (1987) four-item scale: "I like the ad," "I react favorably to the ad," "I feel positive toward the ad," and "The ad is good" (Cronbach's $\alpha = .92$ for lotion and $.92$ for juice).

4.6 | Results

The repeated-measures analysis of covariance indicated that the main effect of ad type was significant, $F(2, 120) = 6.10$, $p = .01$, Cohen's $d = 3.00$ (see Table 7), and the results of the planned contrast were consistent with expectations. That is, both the picture–attribute and picture-dominant conditions generated more favorable brand attitudes than did the attribute-dominant condition; the picture–attribute condition did not generate different brand attitudes from the picture-dominant condition. Pictures played a more important role in brand evaluations than did attributes, in support of H4.

The interaction between product type and ad type was not significant, $F(2, 120) = 0.95$, $p = .39$, Cohen's $d = 1.24$, so the patterns were similar across the two product conditions. Moreover, the analysis of covariance for each product (see Table 7) indicated that the results of the planned contrasts were consistent with the expectations for both juice, the low-involvement product, and lotion, the high-involvement product.

The test for simple mediation of the indirect effects of the independent variable (ad type) on dependent variables (brand attitudes), through changes in mediators (picture attractiveness), used Preacher and Hayes's (2004) bootstrapping methodology (Model 7), with 5,000 bootstrap resamples, to describe the confidence intervals of the indirect effects. The bootstrap results confirmed the mediation model, in that the 95% confidence interval surrounding the indirect effect did not contain 0 for juice [.41, .98] or lotion [.20, .58], indicating a mediating role of picture attractiveness, in support of H5.

4.7 | Discussion

The Study 2 findings indicated that the picture–attribute condition generated significantly more favorable brand attitudes than did the attribute-dominant condition but has similar brand evaluations to those prompted by the picture-dominant condition. Therefore, pictures, rather than attributes, dominated brand evaluation formation. When the featured pictures were attractive and triggered strong intuition-based preferences, System II confirmed the preference by selectively attending to attribute information, without altering intuition-based preferences. The mediation analysis also suggested that participants reading ads with pictures were more likely to form brand attitudes on the basis of their liking of that ad. In other words, attractive pictures first formed strong, intuition-based evaluations; the belief that attractive pictures suggest better products then further affected brand attitudes.

The between-subject design of the study, developed to explore whether consumers engaged in picture- or attribute-dominant evaluation formation, could not prompt consumer decision making, as in Study 1. However, prior research has shown that ad pictures influence brand choices through their influence on brand attitudes (Biehal et al., 1992). Therefore, the reported variations in brand attitudes likely lead to different brand choices.

5 | GENERAL DISCUSSION

5.1 | Findings and contributions

The findings gathered from these studies support the idea of bounded rationality in two decision-making settings, whose distinct product presentation styles serve as ideal backdrops for testing this idea. The question of whether consumers are contingent decision makers, adopting varied selection strategies when they face product options presented in different media or channels, is an important one that has not drawn sufficient research attention. The extension provided herein thus is meaningful in several practically important ways. When consumers need to buy a product (e.g., facial lotion), they could flip through a magazine for product ideas and make a purchase at a brick-and-mortar store, or they may visit e-stores and evaluate the product options and make their purchases online. Magazine ads often

feature dominant, salient background pictures, whereas product pages on e-stores do not, as verified in the pilot study.

Study 1 applied Dhar and Gorlin's (2013) dual system model to illustrate that System I relies on dominant pictures in magazine ads to construct preference, and then System II confirms this preference by processing selective product attribute information. Options that offer inferior performance thus might get selected to a greater degree in the magazine condition than in an e-store condition, because it features an attractive picture. In contrast, in an e-store, the absence of dominant pictures fails to encourage System I-based intuitive preferences, and instead, System II prompts reason-based preference construction. Accordingly, the option that offered the best overall attribute performance was selected more by e-store participants.

In more detail, Study 1 probes the psychological mechanisms that underlie these decision-making processes. For example, it shows that participants relied more on pictures in their preference construction in the magazine condition than in the e-store condition. In contrast, consumers relied more on product attributes in the e-store condition to construct preferences than in the magazine condition. Study 2 confirms that magazine ads trigger picture-oriented evaluation formation; the presence of attractive pictures, but not of positive product attributes, accounts for significant shifts in brand evaluations.

To increase ecological validity, the participants in these studies were exposed to mocked-up websites and magazine segments. Unlike prior research that has exposed participants to just one or two target ads, without any editorial context, Studies 1 and 2 both presented participants with a segment of a magazine, without instructing them to pay particular attention to magazine ads. Thus the findings may better reflect consumers' behaviors and choices in natural contexts.

5.2 | Implications

An understanding of how consumers form product evaluations in different contexts can help practitioners develop more effective retailing strategies or design more effective advertising campaigns. As Payne et al. (1992, p. 118) point out, an effective approach is "to determine the types of processing one wishes to encourage and then design formats that facilitate such processing." Thus if a product offers inferior performance and is sold in brick-and-mortar stores, advertisers may seek to encourage System I preference construction; this article suggests they might do so by featuring attractive, dominant-background pictures in magazine ads and encouraging consumers to form favorable product evaluations through their ad exposure.

If the product instead achieves superior performance and advertisers would benefit from consumers' System II processing, they might adopt different advertising strategies or leverage different retailing channels. For magazine ads, the background pictures should be not too salient or match their product excellence. That is, System II preference can dominate when salient pictures do not overwhelm it, or System I can form an appropriate intuition-based preference that can be confirmed by superior attribute performance during System II processing. Advertisers also are encouraged to include online stores as a potential sales channel. In an e-store setting, with less distracting and unnecessary background pictures, a superior product can make its product attributes salient.

5.3 | Further research directions

This study focuses on preference formation and adopts the dual system model, which was developed specifically to explicate preference construction processes. However, Wegener and Chien (2013) argue that the elaboration likelihood model, which seeks to specify attitude formation, is similar to the dual system model and may have similar explanatory potential. Another possible consideration is the heuristic-systematic model, which focuses on attitude changes and cites similar propositions that may explain the effect of pictures on preference construction. For example, heuristic and systematic evaluation modes might be simultaneous in an additive fashion, or one could bias the other (Chen, Duckworth, & Chaiken, 1999). In the latter case, heuristic-based evaluations likely bias systematic processing and lead to their confirmation. Additional research should develop a paradigm to delineate which theories best explain each proposed preference construction process.

Other mechanisms also could explain this study's findings and deserve attention. For example, pictures can distract or consume cognitive capacity (Adaval, Isbell, & Wyer, 2007), leaving less capacity available to elaborate on attribute information in a verbal list. For this study context, processing dominant-background pictures might consume capacity and make consumers less capable of elaborating on attribute information. Research should test this limited capacity proposition as an alternative explanation.

In addition, varied picture content can affect how presented information is recalled or evaluated (Hartmann, Apaolaza, & Alija, 2013); it also likely determines whether System I or System II dominates preference construction. Dhar and Gorlin (2013) argue that System I processing can be triggered when an option is affect laden, and pictures that trigger strong emotions should dominate preference construction more than those that trigger weak emotions. Pictures also differ in their vividness (Kisielius & Sternthal, 1986). When a dominant-background picture is more vivid, it is more likely to encourage intuition-based preference construction. Furthermore, pictures might convey redundant information or information that differs from that provided by text. Prior research into whether memory effects increase when pictures and text convey the same information has not reached any consensus, such that some studies indicate that congruency facilitates processing and increases memory (Edell & Staelin, 1983; Schmitt, Tavassoli, & Millard, 1993), whereas others find that incongruency encourages elaboration and thus improves memory (Houston, Childers, & Heckler, 1987). According to the dual system model, congruent and incongruent pictures also might work to the advantages of different advertisers. For example, a strong, intuition-based preference triggered by an attribute-congruent picture, rather than an irrelevant picture, may encourage attribute-related confirmation. For superior/inferior products, congruent/incongruent pictures thus may be more beneficial. Further research should test this claim.

People also differ in their processing orientation (Wyer, Hung, & Jiang, 2008), such that some people rely on visual processing and focus on images to process information, whereas others are more oriented toward verbal processing and pay attention to semantic information. The System I preference construction triggered by magazine ads may

be more likely to emerge among visual processors; verbal processors instead may generate more System II-based preferences across different media contexts. Thus further research might productively explore such individual differences as moderators.

5.4 | Limitations

The findings also need to be interpreted in light of the limitations of these studies. First, the pilot study sampled five magazines with the highest circulation and five online stores with the most visits, such that the number of product pages grew so large that analyzing all of them was infeasible. The investigation thus was limited to product pages for facial lotion, yet the use of background pictures may vary across product categories. Second, some comparability concerns arise for Study 1. Although participants had to make choices in both the magazine reading and e-store conditions to enter the gift drawing, they could be motivated by different decision factors in these two conditions. A comparison of decision making in these two settings should take such factors into account. Moreover, though the study design sought to keep the procedures as constant as possible, the characteristics of the two contexts demanded some slight differences in the instructions, to prevent participants from guessing the purpose of the study. Such differences might introduce some noise. Third, the presentation of the three products was not rotated; not all possible combinations of product features and background pictures were tested. These gaps could confound participants' choices. Fourth, some of the scales were developed for the purpose of the study, and they may lack validity.

5.5 | Conclusions

Despite some issues involved in comparing decision making across the unique contexts of magazine reading versus online stores, these typical choice formation settings proffer ideal contexts to test the pertinent idea that in two natural contexts, in which salient background pictures commonly are present as opposed to absent, people adopt different decision-making strategies and thus make different choices. The research findings demonstrate and affirm that consumers are contingent decision makers, and their decision-making strategies are altered by the structure of the environment, in support of the idea of bounded rationality.

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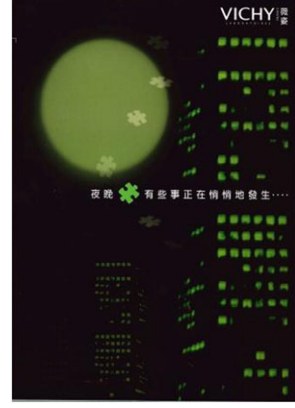
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APPENDIX A

MAGAZINE PAGES FOR STUDY 1

Page 1	Page 2	Page 3	Page 4
<p>Page 1 Cover page</p> 	<p>Page 2 Editorial page</p> 	<p>Page 3 Target ad 1</p> 	<p>Page 4 Article 1</p> 
<p>Page 6 Target ad 2</p> 	<p>Page 6 Target ad 3</p> 	<p>Page 7 Filler ad 1</p> 	<p>Page 8 Filler ad 2</p> 

APPENDIX C

THREE VERSIONS OF ADS FOR FACIAL LOTION AND JUICE USED IN STUDY 2

	Attractive pictures, positive product information	Attractive pictures, without positive product information	Positive product information, without attractive picture
Facial lotion			
	<p>GLOW</p> <p>Advanced skin care newly released.</p> <p>Natural plant extracts</p> <p>No chemicals added. Mild and will not irritate skin. Natural aroma. Moisturizing your skin with no burden.</p>	<p>GLOW</p> <p>Advanced skin care newly released.</p> <p>Natural plant extracts</p> <p>No chemicals added. Mild and will not irritate skin. Natural aroma. Moisturizing your skin with no burden.</p>	<p>GLOW</p> <p>Advanced skin care newly released.</p> <p>Natural plant extracts</p> <p>No chemicals added. Mild and will not irritate skin. Natural aroma. Moisturizing your skin with no burden.</p>
Juice			
Translated copy	<p>MR. FRESH</p> <p>Brand new product. Whole new taste.</p> <p>Only freshly picked apples</p> <p>100% natural. No artificial additives or preservatives. Tasty and sweet, just like freshly picked apples.</p>	<p>MR. FRESH</p> <p>Brand new product. Whole new taste.</p> <p>Only freshly picked apples</p> <p>100% natural. No artificial additives or preservatives. Tasty and sweet, just like freshly picked apples.</p>	<p>MR. FRESH</p> <p>Brand new product. Whole new taste.</p> <p>Only freshly picked apples</p> <p>100% natural. No artificial additives or preservatives. Tasty and sweet, just like freshly picked apples.</p>

