The effects of online product presentation on consumer responses: A mental imagery perspective

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A B S T R A C T
This study investigates the effects of online product presentation on consumer responses from a mental imagery perspective and the moderating effect of style of processing (SOP). College women (N = 550) participated in an online experiment using a 2 (picture: concrete consumption background vs. solid background) × 2 (text: concrete descriptions vs. no descriptions) between-subjects factorial design. The findings suggest that product presentation with a relevant consumption background is more effective in evoking mental imagery than one with a solid white background. Mental imagery increases consumers’ behavioral intentions by eliciting a positive emotional response to product presentations. The findings further show that descriptions of background in text interact with a picture of consumption background to stimulate mental imagery, depending on SOP (visualize vs. verbalizer). The results have practical implications for effective product presentations in online retailing.

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1. Introduction
The manner in which a product is presented impacts the consumer shopping experience both online and offline. Empirical research findings support the idea that well-presented products create a positive mood that further leads to positive shopping outcomes in offline retailing (Turley & Milliman, 2000). In online retailing, effective product presentation not only attracts consumers to a website, but also facilitates consumer purchase decision making in the absence of direct product experiences. In an online environment where consumers are unable to physically examine a product prior to purchase, product presentation plays a critical role in eliciting affective and cognitive responses, subsequently impacting shopping experiences and outcomes. The role online product presentation plays becomes even more vital for products such as apparel that involve sensory experience as part of the consumer decision-making process (Kim & Lennon, 2008; Yoo & Kim, 2012).

Unlike other non-store retail formats such as catalogs, an online retail format provides an interactive environment in which various technology tools can facilitate shopping. Taking advantage of recent advances in technology, an increasing number of online apparel retailers have begun to adopt innovative visualization tools (e.g., zoom, 3D views, and video) to satisfy consumers’ need for sensory product experience (Adobe 7, 2010). Concurrently, a growing number of researchers have examined the effectiveness of online visual product presentation with a strong focus on experiential (hedonic) values facilitated by those visualization tools. According to Jeong, Fiore, Niehm, and Lorenz (2009), consumers’ experiential values refer to “sensory, emotional, and cognitive stimulation, satisfying curiosity” (p. 106). Jeong et al. find that rich and more complex images (e.g., a model situated in an elaborate setting depicting a relevant lifestyle) lead to greater experiential values than basic images (e.g., front views on a plain backdrop) because complex images are more effective in stimulating various emotional and cognitive experiences, resulting in more engaging shopping experiences. Jiang and Benbasat (2007) find that online presentation strategies such as video-without-narration and virtual product experiences are more effective than static pictures and video-with-narration in influencing consumer experiences in terms of interactivity and vividness.

Despite the increasing attention being devoted to online product presentation by both practitioners and scholars, evidence suggests that the lack of sensory product experience continues to be a major deterrent to online purchasing (Internet Retailer, 2005). Over two-thirds of online shoppers prefer offline stores to online stores for apparel purchases, whereas less than one-third of shoppers prefer offline stores for other consumer products (PwC, 2011). This suggests that current online product presentations, even those that utilize a variety of visualization technologies, may not be effective in facilitating virtual product experience. In fact, the effectiveness of current visualization tools is largely anecdotal, and there is much to learn about what makes an online product presentation effective in facilitating a virtual product experience.
Research findings in the area of online product presentation are somewhat inconsistent. For example, despite strong support from advertising and psychology research regarding picture superiority, Kim and Lennon (2008) find that the amount of product information provided in text has a stronger impact than picture size on consumer attitudes and purchase intent. Additionally, in conflict with the general notion that “more is better,” Song and Kim (2012) show that consumers perceive more product information from one large product photo than from four large product photos, possibly due to the lack of visual fluency of multiple photos. Therefore, there is a compelling need for further research on online product presentation.

Addressing this gap in the literature, this study aims to determine which factors make online product presentations effective in facilitating virtual product experience without direct interactions with a product. Drawing on advertising, psychology, and tourism research, this study postulates that mental imagery may be a key construct that facilitates sensory product experience. Mental imagery refers to “a mental event involving visualization of a concept or relationship” (Lutz & Lutz, 1978, p. 611) and involves perceptual information processing, in which information is represented in an individual’s working memory using imagination. Mental imagery of how a garment is represented in consumers’ minds may become a major source of information as they make judgments (Schwarz, 1986). When consumers experience a high level of mental imagery, they may be able to acquire enough information to make a purchase decision without direct product experience. Prior research provides ample empirical support for the positive effects of mental imagery on consumer behaviors (Babin & Burns, 1997; Miller & Stoica, 2003).

Using the mental imagery perspective, this study seeks to identify ways to enhance mental imagery through online product presentations and to examine the process by which the mental imagery elicited by online product presentation influences consumer decision making. This study further examines how an individual characteristic (i.e., style of processing: visualizer vs. verbalizer) influences how a consumer responds to different online product presentations. This study’s findings are expected to shed new light on extant online retailing literature with the mental imagery perspective and to provide practical information for online retailers.

2. Conceptual development

Drawing on dual coding theory from cognitive psychology (Paivio, 2007) and the emotion literature, this study proposes that online product presentation, in terms of how pictures and text are used, evokes different levels of mental imagery, which impacts behavioral intentions through the emotions invoked. Specifically, this study examines how the concreteness of presentation impacts mental imagery and how individual characteristics moderate the relationship between the concreteness of presentation and mental imagery elicited.

2.1. Concreteness

In psycholinguistic studies, concreteness refers to the degree of ease or difficulty involved in eliciting a mental image (Paivio, Yuliffe, & Madigan, 1968). Concrete words such as apple have tangible referents that readily evoke a mental image, while abstract words such as religion lack tangible referents, making it more difficult to evoke a mental image. For some abstract words, related concrete words with tangible referents, such as church, help to evoke a mental image of religion indirectly. This explains why people process concrete words more quickly and accurately than abstract words (Connell & Lynott, 2012).

Concreteness also evokes a level of sensory experience (Paivio et al., 1968; Schwanflugel, Harnishflugel, & Stowe, 1988). Words that refer to objects or materials are more concrete because they readily evoke visual or other sensory experiences. For example, apple is a highly concrete word because apple evokes multiple sensory experiences related to sight, smell, and taste.

In this study, we conceptualize the concreteness of online product presentation in two dimensions: picture and text. We operationalize the concrete picture as having a relevant consumption background that evokes visual and/or other sensory experiences of wearing an item. We further operationalize the concrete text as a written description of a relevant consumption background using concrete words (e.g., a palm fringed beach).

2.2. Mental imagery

As a mental activity that visualizes a concept or relationship (Lutz & Lutz, 1978), mental imagery reflects the process by which sensory or perceptual experience is represented in an individual’s working memory in terms of ideas, feelings, and memories (MacInnis & Price, 1987). Imagery may be multi-sensory in that people can incorporate mental imagery when exposed to auditory, visual, haptic, and/or gustatory stimuli, but mental imagery can also involve a single sensory dimension such as visual (MacInnis & Price, 1987). Visual imagery is the most dominant, followed by auditory imagery (White, Sheehan, & Ashton, 1977).

Focusing on the mental representations of consumption behaviors, consumption vision is a form of mental imagery (Phillips, Olson, & Baumgartner, 1995). Walters, Sparks, and Herington (2007) suggest that imagery has two dimensions: elaboration and quality. Elaboration refers to the number of images evoked in one’s mind, and quality refers to their vividness, clarity, intensity, sharpness, and appeal. Walters et al. show that both concrete pictures and textual descriptions of travel destinations help improve the elaboration and the quality of mental imagery.

Advertising research confirms that visual and verbal advertising messages evoke mental imagery, which further influences cognitive, affective, and conative responses (Babin & Burns, 1997; Bone & Allen, 1992; Fennis, Das, & Fransen, 2012). Tourism research shows that consumers can conjure up a vacation experience by combining various pictures of vacation destinations with their prior experiences (Olson, McAlexander, & Rovert, 1986). The mental imagery evoked by concrete pictures in a travel advertisement enhances behavioral intentions (Miller & Stoica, 2003).

Prior research also supports that concrete text influences mental imagery. In advertising, Burns, Biswas, and Babin (1993) find positive relationships between the concreteness of the advertising copy, the vividness of imagery, and behavioral intentions. Rossiter (1982) suggests that advertising requires concrete text in order to evoke mental imagery. Lien and Chen (2013) also find that concrete text in a narrative advertisement enhances readers’ imagery processing through representing the images in their minds. Similarly, in tourism research, concrete text such as “a palm fringed beach” increases both the elaboration and quality of the mental imagery (Walters et al., 2007) (see Table 1).

Both websites and print advertising use pictures and text as basic forms of communication (Singh & Dalal, 1999). Thus, it is plausible to postulate that concrete pictures and text on a retail website also evoke mental imagery, as in print advertising. If online retailers present an apparel item with a concrete consumption background, consumers may more readily engage in consumption imagery, compared to the item presented with a solid background. Similarly, an apparel item presented with concrete text of consumption background may be more effective in generating mental imagery than the item presented without such text.

In retailing, Hirschman (1984) notes that mental imagery impacts consumers’ ability to imagine (visualize images in the mind), recall prior experiences in images, and change their cognitive states. When the product is absent in the physical environment, people evaluate a product using their mental imagination of consumption experience (Horowitz, 1972). Thus, in online retailing, product images (e.g., swimsuits) on a relevant consumption background (e.g., beach) and/or...
concrete text (e.g., crystal-clear water and beautiful marine reefs) may evoke mental imagery of consumption situations and thus facilitate a consumption vision of wearing that swimsuit. However, as yet such methods have rarely been used for retail websites. A content analysis of the top 30 online apparel retailers’ product pages (based on Internet Retailer (2011)) conducted as a pilot study for this research reveals that only two out of the 30 websites display product images with consumption backgrounds, and only one website uses concrete text depicting consumption backgrounds on a product page. Some online retailers have used consumption backgrounds on their home pages, but the use of solid backgrounds is dominant for product pages where consumers actually make a purchase decision. Based on the literature review, we hypothesize that concrete pictures and text enhance mental imagery.

H1. Consumers experience greater mental imagery when exposed to a concrete picture, in comparison to no concrete picture (a: elaboration, b: quality).

H2. Consumers experience greater mental imagery when exposed to concrete text, in comparison to no concrete text (a: elaboration, b: quality).

2.3. Dual coding theory

Dual coding theory from cognitive psychology (Paivio, 2007) explains that an individual’s cognition involves the joint activity of two independent but interconnected systems: a nonverbal and a verbal system. A nonverbal system deals with objects and events whereas a verbal system deals directly with language. Based on these two coding systems, nonverbal and verbal information can be encoded. For example, nonverbal information, such as a picture, is encoded through the nonverbal system, while text is encoded through the verbal system. However, since these systems are interconnected, nonverbal information stimulates the verbal system, just as verbal information stimulates the nonverbal system. As a result, people obtain more information when both visual and verbal information are presented than when only one is available.

In print advertising, Walters et al. (2007) find that concrete pictures and text interact to influence the elaboration of mental imagery. With less concrete pictures or no pictures, people experience greater elaboration when they both receive concrete words and are instructed to imagine. When concrete pictures are present, the absence of text (both concrete words and instruction to imagine) increases elaboration. Also, when concrete pictures are present, the presence of text (instruction to imagine) is successful in evoking elaboration. Kim and Lennon’s (2008) research on visual (picture size) and verbal (amount of product information in text) presentations in online apparel shopping also finds interaction effects between pictures and text. For example, the effect of picture size on consumer attitude is significant only when verbal product information is low, whereas the effect of verbal product information is significant only for small pictures. Thus, we hypothesize that the effect of concrete pictures (text) on mental imagery may change as a function of the availability of concrete text (pictures).

H3. Concrete pictures and text interact to increase mental imagery (a: elaboration, b: quality).

2.4. Style of processing (SOP)

How individuals acquire and utilize information vary. Depending on individuals’ cognitive styles, people may use more or fewer verbal or visual cues in cognition, making them either verbalizers or visualizers (Richardson, 1994). Visualizers are image-oriented consumers who like to see images, whereas verbalizers are text-oriented consumers who prefer to read. According to Rossiter and Percy (1978), the effects of image-oriented print advertisements on consumer reactions vary as a function of SOP, with visualizers experiencing greater visual imagination through visual images than verbalizers.

Considering the wealth of visual and verbal cues on websites, SOP is likely to have significant implications for online retailers. Yet, SOP has not been studied in the context of online product presentation. Based on prior research related to SOP, we hypothesize that concrete pictures will have a greater impact on visualizers whereas concrete text will have a greater impact on verbalizers, and that the interaction effect between concrete pictures and text on mental imagery may change as a function of SOP.

H4. The effect of concrete pictures on mental imagery is greater for visualizers than for verbalizers, whereas the effect of concrete text on mental imagery is greater for verbalizers than for visualizers (a: elaboration, b: quality).

H5. The interaction effect of concrete pictures and concrete text on mental imagery differs between visualizers and verbalizers (a: elaboration, b: quality).

2.5. Mental imagery and emotion

Mental representations of a situation engage individuals emotionally as if they are experiencing the situation in reality (Schwartz, Weinberger, & Singer, 1981). In retailing, Compeau, Grewal, and Monore (1998) suggest that imagination may be an important aspect influencing consumers’ emotion.
Dual coding theory explains that visual and verbal information elicit individuals' emotional reactions, connecting to visual mental representations. In addition, verbal information additionally elicits emotions by activating visual representation of emotional events. For example, when an individual reads a horror story, the story activates the reader's mental imagery related to the story and, consequently, evokes emotions. Paivio's (1978) empirical test supports a superior effect of visual information on evoking emotions compared to verbal information.

In an effort to change consumer behavior, social marketers have used mental imagery to evoke fear and anxiety by emphasizing the negative consequences associated with an event or behavior. For example, a negative consequence of smoking (e.g., cigarette smoking is dangerous to your health) creates an elaborate mental representation, which ultimately evokes fear (Keller & Block, 1996). In contrast, Holmes, Mathews, and Dalgleish (2006) manipulated descriptions of a positive event, causing participants to engage in different information processing. One group of participants was asked to imagine the event (imagery condition) while another group was asked to listen to the descriptions of the event and think about the verbal meaning of the descriptions (verbal condition). The results show that participants in the imagery condition experience stronger positive emotion and less anxiety than those in the verbal processing condition, supporting the effect of mental imagery on positive emotion. The degree of mental imagery (e.g., elaboration and quality) influences the intensity of the emotion (MacInnis & Price, 1987). Thus, we hypothesize that there is a positive relationship between mental imagery and emotion.

**H6.** Mental imagery associates with positive emotion (a: elaboration, b: quality).

### 2.6. Mental imagery and behavioral intentions

Behavioral intentions refer to “what a person intends to do” in a specific area of behavior (O'Keefe, 2002, p. 101). According to Zeithaml, Berry, and Parasuraman (1996), consumers' behavioral intentions are either favorable or unfavorable. Favorable behavioral intentions include positive word-of-mouth and increased purchases from the retailer, whereas unfavorable behavioral intentions include negative word-of-mouth, brand switching, and decreased purchases from the retailer.

Research suggests that mental imagery influences behavioral intentions. Miller and Stoica (2003) find that the mental imagery evoked by a concrete photograph in a tourism advertisement significantly increases consumers’ intentions to visit the tourism website. Furthermore, Burns et al. (1993) find that the mental imagery evoked by concrete text in advertising increases intention to think about the advertised offer and intention to purchase.

To date, the relationship between mental imagery and behavioral intentions in online retailing is largely unknown. Given the importance of product pages in making sales for online retailers, the current study focuses on how the mental imagery evoked by online product presentation impacts behavioral intentions in terms of website visits, online purchasing, and positive word-of-mouth. In the absence of direct product interactions, this study proposes that mental imagery increases behavioral intentions by facilitating product sensory experiences.

**H7.** Mental imagery positively associates with behavioral intentions (a: elaboration, b: quality).

### 2.7. Positive emotion and behavioral intentions

Prior research provides empirical support for the relationships between emotion and behaviors or behavioral intentions (Donovan & Rossiter, 1982; Eroglu, Machleit, & Davis, 2003; Lee & Thorson, 2009). In environmental psychology, Donovan and Rossiter (1982) demonstrate that pleasure is an important determinant of behavioral intentions and spending behavior. In an online context, Lee and Thorson (2009) illustrate the effect of affective and cognitive websites on behavioral intentions. An affective website evoking emotional reactions (e.g., feeling interested) leads to higher purchase intentions than a cognitive website evoking thought-related reactions. Similarly, Eroglu et al. (2003) find that pleasure and arousal elicited by such websites positively influence attitudes toward the websites and shopping behaviors. Thus, we hypothesize a positive relationship between emotion and behavioral intentions.

**H8.** Positive emotion associates with behavioral intentions.

### 3. Method

This study's design is a 2 (picture: concrete consumption background vs. solid background) × 2 (text: concrete descriptions vs. no descriptions) between-subjects factorial design. SOP (visualizer vs. verbalizer) serves as a moderator.

#### 3.1. Stimulus development

This study includes a total of four pretests. The first three pretests aim to develop experimental websites with reliable stimuli, and the fourth pretest to select emotion measures relevant to the context of this study. The first pretest was conducted to select relevant visual stimuli. Twelve outfits with concrete consumption backgrounds were downloaded from commercial websites. Using Adobe Photoshop, pictures of the 12 outfits on solid white backgrounds were created. A convenience sample of college women (N = 70) was randomly assigned to one of the two treatment conditions. Participants viewed the 12 images in the same condition and reported the degree of mental imagery experienced with each stimulus. Mental imagery is measured using Walters et al.'s (2007) scale focusing on future consumption situations. Consistent with the original scale, an exploratory factor analysis (EFA) of 13 items yields two factors, "elaboration" (Cronbach's alpha = .89) and "quality" (Cronbach's alpha = .98). The three visual stimuli with the highest mental imagery scores (elaboration: M > 4.84; quality: M > 4.98 out of 5) are selected for the main experiment. Higher scores indicate that the participants experienced greater elaboration and quality of mental imagery from the images. MANOVA and ANOVAs further reveal that three visual stimuli yield significant differences between the two experimental conditions (all ps < .05).

For the second pretest, fashionability of the three outfits was measured to avoid any potential influence from products per se. College women (N = 34) rated the fashionability of the three outfits based on six items using a 7-point scale (Cox & Cox, 2002) (Cronbach's alpha = .91). Mean scores from the three styles range from 4.3 to 4.8, indicating that they are fairly neutral in terms of fashionability.

A third pretest aims to develop a suitable concrete text depicting a relevant consumption background using concrete words. College women (N = 77) were asked to rate nine concrete texts adopted and revised from commercial websites in terms of the degree of mental imagery experienced. Because only concrete text was presented without product images in this pretest, the scale focusing on consumption situations (i.e., Walters et al., 2007) was not considered suitable. Thus, Miller and Marks (1997) scale tapping general mental imagery was used (Cronbach’s alphas: .82 to .92). Among the nine descriptions, three descriptions with the highest mental imagery scores are selected (M = 4.50 to 4.68 out of 5, SDs = 1.34 to 1.56). Based on the results of the three pretests, mock websites simulating apparel websites are developed for the main experiment.

A fourth pretest aims to develop emotion items relevant to the present study. Shaver, Schwartz, Kirson, and O'Connor's (1987) extensive review of emotions guided the study. After reviewing 49 emotion
words in the joy and love categories from Shaver et al., 19 emotion
texts deemed the most relevant to this study were selected. Pretest
participants (N = 36) viewed one web page including the three selected
outfits from the first pretest with concrete pictures of consumption
backgrounds and concrete text designed to evoke mental imagery.
After viewing the stimuli, participants chose relevant words from the
list of 19 emotion words and also added emotion words in an opend-
ended format if a relevant emotion word was not available on the list.
Participants added three new emotion words (comfortable, focused,
and calm) to the list of 19 emotion words, resulting in a total of 22
emotion words. Based on frequency counts and a consideration of
their relevance to this study’s context, 10 positive emotion items
(amused, pleased, joyful, happy, hopeful, stimulated, relaxed, content-
ed, delighted, and satisfied) are selected for the main experiment
(Cronbach’s alpha = .96).

3.2. Instrument development

All the dependent measures of consumer responses except positive
emotions are adopted from the existing literature with adequate reli-
abilities (see Table 2). All items use a 7-point scale. For mental imagery,
nine Likert-type items and four semantic differential items are adopted
from Walters et al. (2007) and modified to fit this study. Three semantic
differential scale items are used to measure intention to purchase, in-
tention to recommend the website, and intention to revisit the website
(Kwon & Lennon, 2009). For SOP measure, 22 items with anchors of
“always false” as 1 and “always true” as 7 are adopted from Burns
et al. (1993).

3.3. Procedure

We sent out invitation emails with a URL to 4000 female students
randomly selected by the Office of the Registrar at a large U.S. university.
College women are frequent online shoppers for apparel products
(Denis & Fenech, 2004) and are thus deemed suitable for the study.
We sent out one reminder email after seven days. For stimulus sampling
purpose, each participant viewed the three product pages in one of the
four treatment conditions: (1) product display with concrete pictures of
consumption backgrounds and concrete text depicting consumption
backgrounds, (2) product display with solid backgrounds and no con-
crete text, (3) product display with solid backgrounds and concrete text,
and (4) product display with solid backgrounds and no concrete
text. When participants logged onto the experimental website, they
read a shopping scenario and then viewed three product pages, one at
time. After viewing the three product pages, participants answered all de-
pendent measures, including demographic items at the end of the questionnaire.

4. Results

Of the total 550 usable responses, the majority of participants are
Caucasian (80%), followed by Asian (13%), with a mean age of 23.5
(SD = 6.28) and a range of 19 to 64. In terms of academic standing, se-
niors make up the largest group (43.8%), followed by juniors (29.5%),
and then graduate students (14.3%). About 42% of the participants
browse apparel online frequently, while about 13% of the participants
purchase apparel online frequently.

4.1. Preliminary analyses

Multi-item scales are subjected to EFA to assess dimensionality. Consis-
tent with Walters et al. (2007), EFA on the mental imagery scale
yields two factors, “elaboration” and “quality,” and includes a total of
13 items. Also, consistent with Burns et al. (1993), EFA on the SOP
scale yields two factors, verbalizer and visualizer. Following the procedure
used in prior studies (Burns et al., 1993; Gould, 1990), participants
are divided into two groups, visualizers and verbalizers. The reliabilities
of the dependent variables range from .81 to .98, indicating adequate in-
ternal consistency of the scales.

4.2. Measurement model specification

Based on a two-step modeling approach (Anderson & Gerbing,
1988), a confirmatory factor analysis (CFA) is conducted. Maximum
likelihood estimation is employed to assess parameters for the CFA.
Overall, the results of the CFA indicate a satisfactory fit of the model
to the data (χ^2 = 70.72, df = 24, p < .000, RMSEA = .06 [90% CI =
(.04; .08)], NFI = .98, CFI = .99, IFI = .99, and TLI = .98).

In order to assess construct validity, convergent validity and discrim-
inant validity are examined. The results from CFA of the measurement model
reveal that all path coefficients in the CFA model are greater than .7 and statistically significant at the p value of .001 level, providing evidence of convergent validity. Assessing discriminant validity using
chi-square difference tests between an unconstrained model and
constrained models (Anderson & Gerbing, 1988) reveals that all the
chi-square difference tests are significant in this study (see Table 3),
thus establishing discriminant validity between constructs.

4.3. Hypothesis testing

Hypotheses 1 to 5 examining the effects of online product presenta-
tion on mental imagery are tested using MANOVA (part 1, see Fig. 1).
There is a significant multivariate main effect for pictures [Wilks’ λ =
.99, F (2, 541) = 3.20, p < .05, partial η^2 = .01] on the elaboration and
quality of mental imagery. Subsequent ANOVAs show a significant
main effect for pictures on elaboration [F (1, 542) = 6.40, p < .05, partial
η^2 = .01], but not on quality (p = .13). Inspection of cell means reveals that
participants exposed to the product displays with concrete con-
sumption backgrounds experience higher elaboration of mental imag-
ery (M = 4.28, SD = 1.36) than those exposed to the same product
displays with solid backgrounds (M = 4.02, SD = 1.22). Multivariate
main effect for concrete text and multivariate interaction effect of pic-
tures by text are not significant. Thus, only H1a is supported.

H4 and H5 examine the moderating effects of SOP on the relation-
ship between product presentation and mental imagery. There are three interaction relationships of interest when testing the moderating effects of the SOP: (1) pictures × SOP, (2) text × SOP, and
(3) pictures × text × SOP. The MANOVA results reveal a significant mul-
tivariate interaction effect of pictures by SOP on mental imagery [Wilks’
λ = .99, F (2, 541) = 3.39, p < .05, partial η^2 = .01]. However, the mul-
tivariate interaction effect for text by SOP is not significant. Subsequent
ANOVAs show significant interaction effects of pictures by SOP on elaboration [F (1, 542) = 6.77, p < .05, partial η^2 = .01] but not on quality (p = .16). Simple effect tests show that the effects of pictures on elaboration [F (1, 542) = 13.08, p < .000, partial η^2 = .02] are
significant only for verbalizers. In other words, compared to

Table 2
Scales used to measure dependent variables.
<table>
<thead>
<tr>
<th>Variables</th>
<th>Prior study</th>
<th>Cronbach’s alpha from the original reference</th>
<th>Cronbach’s alpha in this study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental imagery</td>
<td>Walters et al. (2007)</td>
<td>.84 to .93</td>
<td>.92 to .96</td>
</tr>
<tr>
<td>Behavioral intentions</td>
<td>Kwon and Lennon (2009)</td>
<td>.94</td>
<td>.95 to .98</td>
</tr>
<tr>
<td>Style of processing (SOP)</td>
<td>Burns et al. (1993)</td>
<td>.74 to .75</td>
<td>.81 to .83</td>
</tr>
</tbody>
</table>
verbalizers, visualizers experience greater elaboration of mental imagery ($M = 4.84, SD = 1.23$) in the concrete background condition than in the solid background condition ($M = 4.36, SD = 1.20$). Therefore $H_4$ is partially supported (see Fig. 2).

Results further reveal that a multivariate interaction effect for pictures by text by SOP is significant [Wilks’ $\lambda = .98$, $F (2, 541) = 4.34$, $p < .05$, partial $\eta^2 = .02$]. ANOVAs reveal a significant interaction effect for pictures, text, and SOP on elaboration [$F (1, 542) = 8.69$, $p < .01$, partial $\eta^2 = .02$], but not on quality ($p = .09$). In other words, the interaction of pictures by text on elaboration is significantly different between visualizers and verbalizers. The results of simple effects provide support for $H_{5a}$. When verbalizers view products displayed on solid backgrounds, the effects of text are significantly different on elaboration [$F (1, 542) = 7.57$, $p < .01$, partial $\eta^2 = .01$]. Inspection of cell means reveals that verbalizers experienced greater elaboration of mental imagery ($M = 3.96, SD = 1.08$) when solid backgrounds and concrete text are present. However, when verbalizers view concrete pictures, the effects of text are not significant. On the other hand, when visualizers view concrete pictures, the effect of text on elaboration [$F (1, 542) = 4.68$, $p < .05$, partial $\eta^2 = .01$] is significant. Visualizers experience greater elaboration of the mental imagery when both concrete pictures and concrete text are used. However, when visualizers view products on solid backgrounds, the effects of concrete text are not significant.

$H_6$ through $H_8$ investigate the process by which mental imagery influences behavioral intentions (part II, see Fig. 1). Single group structural equation modeling using the maximum likelihood function yields an overall chi-square of 80.41 ($df = 30$, $p < .001$), NFI = .98, CFI = .99, IFI = .99, TLI = .98, and RMSEA = .05 [90% C.I. = (.04; .07)]. Overall fit indices suggest an acceptable fit to the data. As shown in Table 4, all relationships are significant. Mental imagery evoked from product presentation positively associates with both emotion and behavioral intention. Also, emotion positively influences behavioral intention. Thus, $H_6$ through $H_8$ are all supported.

![Fig. 1. Proposed conceptual model of mental imagery and consumer responses.](image1)

![Fig. 2. Interaction effects of visual information by verbal information in visualizers and verbalizers on elaboration of mental imagery.](image2)
Table 4
Results from the SEM for testing hypotheses.

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Parameter</th>
<th>Est.</th>
<th>SE</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>H6a</td>
<td>Elaboration (ξ1) → positive emotion (η1)</td>
<td>γ11</td>
<td>.44</td>
<td>.06</td>
</tr>
<tr>
<td>H6b</td>
<td>Quality (ξ2) → positive emotion (η1)</td>
<td>γ12</td>
<td>.22</td>
<td>.06</td>
</tr>
<tr>
<td>H7a</td>
<td>Elaboration (ξ1) → behavioral intentions (η2)</td>
<td>γ21</td>
<td>.26</td>
<td>.07</td>
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<tr>
<td>H7b</td>
<td>Quality (ξ2) → behavioral intentions (η2)</td>
<td>γ22</td>
<td>.17</td>
<td>.06</td>
</tr>
<tr>
<td>H8</td>
<td>Positive emotion (η1) → behavioral intentions (η2)</td>
<td>β21</td>
<td>.40</td>
<td>.05</td>
</tr>
</tbody>
</table>

Model fit
Chi-square = 80.413 (df = 30)
RMSEA = .05 90% C. I. (.041; .07)
TLI = .98, NFI = .98, CFI = .99, IFI = .99

** p < .01, *** p < .001.

4.4. Additional analysis: decomposition of effects

Decomposition of effects further examines the relationships among dependent measures. As shown in Table 5, both the elaboration and quality of the mental imagery have significant indirect effects on behavioral intentions via positive emotion. Decomposition of effects also reveals significant direct effects from the elaboration and quality of the mental imagery on behavioral intentions. In other words, positive emotion is a partial mediator in the relationship between mental imagery and behavioral intentions.

5. Discussion and conclusions

The findings of this study provide theoretical and practical insights that will help both researchers and retailers understand the effectiveness of online product presentation from a mental imagery perspective. The key aspect of online product presentation examined in this study is the concreteness of presentation using consumption background pictures and text. This study examines what evokes mental imagery in an online context and further investigates the process by which the mental imagery evoked by concrete pictures and text impacts consumer emotions and behavioral intentions. The results provide empirical evidence that concrete pictures are effective in facilitating virtual product experience through greater elaboration of mental imagery, which ultimately increases behavioral intentions via positive emotions.

Consistent with prior research (Babin & Burns, 1997; Burns et al., 1993; Walters et al., 2007), this study’s findings provide empirical support for the importance of mental imagery and have useful managerial implications for enhancing the effectiveness of online product presentations. While many online apparel retailers commonly use solid backgrounds to display products, this study shows that concrete pictures of relevant consumption backgrounds help consumers elaborate on mental imagery of future consumption of the product. Thus, the results of this study suggest that online retailers can enhance consumers’ virtual product experience by increasing the concreteness of online visual product presentations. Particularly in online apparel retailing, where sensory experience is crucial but lacking, retailers’ ability to evoke such mental imagery through effective product presentation is vital.

Contrary to previous research findings (Burns et al., 1993; Miller & Marks, 1997; Walters et al., 2007), this study reveals that concrete text depicting consumption background does not influence mental imagery. Perhaps the picture superiority effect (Paivio, 2007) can provide an explanation for this finding. According to Rossiter (1982), visual information outperforms verbal information in affecting consumer responses. In addition, Kroeb-Riel (1984) finds that most consumers pay attention to the dominant picture first in a print advertisement before focusing on textual information. Others suggest that larger pictures, colored pictures, and diverse-colored pictures make it easier to attract consumers’ attention (Cromhaug, Kvitastein, & Grenmo, 1991). In the current research, product images may have been more dominant than text in gaining participants’ attention, possibly because of the sensory nature of the apparel products (Song & Kim, 2012). Consumers generally begin their shopping by visually scanning apparel styles before reading the written descriptions provided on the webpage.

The results also reveal that SOP moderates the relationship between the concreteness of pictures and mental imagery. Visualizers (the high SOP group) experience greater elaboration of mental imagery than verbalizers (the low SOP group) when exposed to a product display with a concrete picture. There are also significant interaction effects of pictures by text as a function of SOP. Although the interaction effect of pictures by text is not significant, when an individual’s information processing style is considered, the interaction effect is significantly different for visualizers and verbalizers. For example, when visualizers view a product display with concrete pictures, concrete text depicting consumption backgrounds using concrete words significantly increases the elaboration of the mental imagery. However, when visualizers are exposed to a product display with a solid white background, there is no effect of concrete text of consumption background. Furthermore, when verbalizers view a product display with a solid background, concrete text generates greater elaboration of mental imagery than does the absence of concrete text. These findings provide some empirical evidence to support dual coding theory, which posits that visual and verbal systems interact to influence mental imagery and the effect of

Table 5
Decomposition of direct, indirect, and total effects for the hypothesized model.

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Predictor variable</th>
<th>Indirect effect</th>
<th>Direct effect</th>
<th>Total effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioral intentions</td>
<td>Elaboration of mental imagery</td>
<td>.18**</td>
<td>.26**</td>
<td>.43**</td>
</tr>
<tr>
<td>Behavioral intentions</td>
<td>Quality of mental imagery</td>
<td>.09**</td>
<td>.17**</td>
<td>.25**</td>
</tr>
<tr>
<td>Behavioral intentions</td>
<td>Positive emotion</td>
<td>.40**</td>
<td>.40**</td>
<td>.40**</td>
</tr>
</tbody>
</table>

* p < .05, ** p < .01, *** p < .001.
SOP in online retailing. If online retailers present concrete text describing a consumption situation, concrete text may help some consumers create more elaborate mental imagery under certain conditions.

The findings from structural equation modeling demonstrate the process by which mental imagery influences behavioral intentions through its impact on positive emotion; both the elaboration and quality of mental imagery increase positive emotions experienced. The decomposition of effects further supports past research that shows how positive emotion mediates a relationship between mental imagery and behavioral intentions (Burns et al., 1993; Miller & Marks, 1997; Paivio, 1978). This finding provides empirical support for the importance of mental imagery in online product presentation in terms of increasing behavioral intentions.

The role of concrete pictures in evoking mental imagery has long been supported in advertising and tourism research (Babin & Burns, 1997; Walters et al., 2007). This study extends the existing literature by providing empirical support for the importance of mental imagery in an apparel online retailing context and provides a new perspective to enhance the effectiveness of online product presentations. When developing product presentation strategies, online retailers need to consider how to increase mental imagery.

5.1. Limitations and recommendations

This study has several limitations. The scope of the study is limited due to its focus on college women’s responses to online product presentations. While college women comprise a major portion of online shoppers for apparel (Denis & Fenech, 2004), this group may not be representative of all online apparel shoppers. Thus, future research needs to include a more diverse group of online shoppers for generalizability.

A further limitation pertains to the type of product studied. This study focuses on apparel products due to their heightened need for sensory experience in online retailing. Future studies may consider examining more diverse product categories, including both search and experience goods. Future research needs to investigate whether other product presentation strategies (i.e., product coordination, product customization, virtual product experience) from a mental imagery perspective.

The effect of text on mental imagery is not significant in this study. One possible reason for the insignificant result may be related to different mental imagery scales used in the pretest and the main experiment. More research on the effects of text is warranted.

This study supports the effect of concreteness of product presentation on the elaboration of mental imagery, but not on the quality. Products presented in concrete pictures with consumption backgrounds instead of solid backgrounds enable consumers to generate more images in their minds. However, concrete pictures do not impact the quality of mental imagery in terms of vividness, clarity, or intensity. Future research needs to explore how the quality of the mental imagery evoked can be improved. Additionally, visual fluency and information richness need to be explored to improve our understanding of the effectiveness of online product presentation.

References

Internet Retailer (2011). Top 500 guide. Chicago, IL: Vertical Web Media LLC.


