PERCEPTUAL AND CONCEPTUAL EFFECTS OF INCIDENTAL EXPOSURE TO WEB ADS

Research-in-Progress

Xinwei Wang
School of Computing
National University of Singapore
wangxw@comp.nus.edu.sg

Hock-Hai Teo
School of Computing
National University of Singapore
teohh@comp.nus.edu.sg

Abstract

Extant literature on web ads tends to isolate web ads from the web environments that they are embedded in and focus on individuals’ responses to the web ads per se. As a departure, our research recognizes the possible subtle influences that web ads could exert on consumers when they shop online by drawing on the marketing literature on perceptual and conceptual fluency. We hypothesize that a salient web ad can exert perceptual and conceptual influence on a consumer’s online shopping behavior such that the consumer is more likely to choose a product that has a perceptual or a conceptual link to the stimuli contained in the web ad and to use the activated mind-set to evaluate and choose products. We present three experiments, two completed and one on-going, that are designed to test the hypotheses empirically. Preliminary data analyses of the completed experiments have largely supported our hypotheses.

Keywords: web advertising, Internet marketing, electronic commerce, online shopping, perceptual fluency, conceptual fluency
Introduction

In the U.S. alone, online advertising expenditure reached over 32 billion in 2011 (eMarketer 2012), showing that the web has evolved into a mainstream commercial medium and advertising channel for marketers (PriceWaterhouseCooper 2011). Marketers’ rising ad dollars on the Internet would eventually increase the complexity of online shopping environments. When processing the product information related to their primary online shopping tasks, consumers are also increasingly exposed to web ads displayed peripherally in a variety of formats such as graphs, texts, animations, flashes, and videos.

The prevalence of web ads in online shopping contexts has led to a large body of literature on them. These studies have generated significant insights into the variables that can enhance the effectiveness of web ads, which is generally assessed by their ability to garner online consumers' visual and cognitive attention, imprint product brands on their memory, and elicit direct behavioral responses such as clicking on the ads and purchasing of the advertised products (e.g., Chan et al. 2010; Goldfarb and Tucker 2011; Moore et al. 2005; Sundar and Kalyanaraman 2004; Yaveroglu and Donthu 2008; Yoo 2007; Yoo 2008). Overall, these studies exhibit a predominant emphasis on web ads per se. As a departure, our research focuses on online shopping environments as a whole. Viewing web ads as contextual cues, we employ the theory of context effects to examine whether and how web ads could influence online consumers’ behavior pertinent to their primary shopping tasks.

The theory of context effects suggests that consumer cognition and behavior, such as product evaluations and purchase decisions, can be shaped by subtle contextual cues that consumers are exposed to incidentally (Berger and Fitzsimons 2008; Dijksterhuis et al. 2005). Contextual cues, even when being processed unconsciously, can result in perceptual or conceptual fluency that influences the individual’s response to the focal target (Berger and Fitzsimons 2008; Zhu and Meyers-Levy 2009). For instance, consumers are more likely to choose orange-associated products when the color orange is more prevalent in the environment (e.g., during the Halloween season) (Berger and Fitzsimons 2008). In the context of media-mediated communication, it has been documented that the exposure to print ads can affect consumers’ product information processing (Yi 1990).

Although generally online customers actively ignore web ads and click-through rates have over years declined to below 1% (Dreze and Hussher 2003; Hollis 2005), recent studies underscore the possibility that web ads could operate as contextual cues to affect consumer cognition and behavior. First, powerful computing techniques are employed to deliver web ads, making them more obtrusive and difficult to be ignored (Goldfarb and Tucker 2011). Second, studies have shown consumers often process web ads unconsciously even if they avoid web ads purposefully (Yoo 2007; 2008). As unconscious processing of contextual information could lead to fluency in processing of the target that has perceptual or conceptual connections with the information, we theorize that the web ads embedded in online shopping information environments may act as contextual stimuli to influence online consumers’ processing of product information and purchase decisions.

The research makes theoretical contributions on two important grounds. First, it enhances the research on web ads by examining them in the larger e-commerce shopping contexts they are embedded in and presenting a more complete picture of their effects on online consumers. Second, it extends the theory of context effects which is generally applied in traditional marketing studies to the e-commerce domain. Practically, our research can serve as a guideline for practitioners to design and organize the presentation of product information and the deployment of web ads on e-commerce websites. It could also enable merchants and marketers to evaluate their investments in online advertising on a new dimension.

This paper reports three studies, two completed and one on-going, that are designed to demonstrate the perceptual and conceptual effects of web ads on consumers’ online shopping behavior.
Theoretical Backgrounds and Research Hypotheses

Perceptual and Conceptual Contextual Effects

Individuals’ cognition and behavior are often not only affected by the information they have, but also by how easy it is for them to process the information, which is captured by information processing fluency (Lee and Labroo 2004; Tversky and Kahneman 1973). The “feeling as information” proposition offers an explanation of the effects of information processing fluency (Schwarz 2004). It contends that how easy the individual can process the information of a target will produce feelings that are, together with the information itself, incorporated into judgment formulation and decision making pertinent to the target. A positive feeling resulting from processing fluency will lead the target to be evaluated more favorably and chosen more likely.

The theory of context effects posits that various stimuli embedded in an individual’s context can give rise to processing fluency (Bargh and Chartrand 2000; Shapiro 1999). Contextual stimuli, although are not directly related to the individual’s primary task and not the object of attention, can leave memory traces and activate certain schema and concepts. When the individual processes product information, product features and concepts related to those stimuli will be more accessible, resulting in processing fluency (Berger and Fitzsimons 2008; Zhu and Meyers-Levy 2009). The effects of contextual stimuli on processing fluency can occur at both perceptual and conceptual levels.

Perceptual fluency occurs when an individual’s past exposure to environmental stimuli leads to the ease with which the individual processes the product’s physical features (e.g., shape, brightness, color) related to those stimuli (Jacoby and Dallas 1981; Shapiro 1999). For instance, Berger and Fitzsimons (2008) have documented that the color of the pen that participants used for answering survey questions led them to choose more products of that same color. Specifically, participants who used a green (orange) pen chose more products that were associated with green (orange) such as Lemon-Lime Gatorade (Sunkist orange soda).

Conceptual fluency occurs when an individual’s prior exposure to environmental stimuli activates certain concepts and leads to the ease with which these concepts and some other related concepts come to the individual in other contexts (Hamann 1990; Lee and Labroo 2004; Shapiro 1999). Conceptual fluency operates through a spreading activation process. Spreading activation model (Anderson 1983; Collins and Loftus 1975; Rumelhart and McClelland 1982) posits that concepts are represented as various notes that are distributed over a complex associative network. The number of pathways between the notes and the strength of these pathways define the closeness and relatedness of the corresponding concepts. When one concept is activated, the activation spreads along the associative pathways to related concepts. This spread of activation serves to make those concepts related to the source concept more available for further cognitive processing (Balota and Lorch 1986). Thus, conceptual fluency does not require explicit elaboration and can take place automatically and unconsciously (Kunst-Wilson and Zajonc 1980). Empirically, taking advantage of the strong cognitive association between dogs and cats, Berger and Fitzsimons (2008) have shown that subjects who had been exposed to dog pictures evaluated Puma sneakers more favorably than those who had not.

Additionally, conceptual fluency resulting from contextual stimuli may also manifest as the activation of a mind-set related to the concept. The activated mind-set shapes how the individual interpret and construe the focal target. For instance, Zhu and Meyers-Levy (2009) have demonstrated that the posters hung on the wall in a shopping area, which conveyed either an interdependent or an independent relationship between the self and others, could effectively manipulate the shopper’s perception of relationships among different objects, which in turn affects their product evaluation and choice.

Furthermore, research has documented that the increased frequency of the exposure to contextual stimuli can strengthen perceptual and conceptual fluency (Berger and Fitzsimons 2008). Frequent exposures can repeatedly prime perceptual features and conceptual constructs contained in the stimuli, leading them to be more accessible when the individual processes the focal task.
Contextual Effects of Web Ads in e-Commerce Settings

Online shopping involves intensive information processing. Consumers evaluate products by scrutinizing different product information such as attributes, images, reviews, etc. presented on e-commerce websites. Studies have shown that the presentation of product information on the web can affect many aspects of consumer behavior and subtle changes in a web environment can produce changes in consumer behavior (e.g., Mandel and Johnson 2002; Tam and Ho 2006). However, previous studies have a predominant focus on the presentation of the focal product and the potential effects of web ads on consumers’ behavior pertinent to their primary shopping activities have not received adequate research attention.

The neglect could possibly be justified by the fact that more than half of online users may not pay attention to web ads (Dreze and Hussherr 2003; Shankar and Hollinger 2007). However, recent studies on web ads highlight the need to explore whether web ads could exert contextual effects on consumers’ online shopping behavior. Researchers have observed that marketers are using more powerful techniques to deploy web ads, making them more obtrusive and difficult to be ignored (Goldfarb and Tucker 2011). Additionally, studies have shown that web ads are processed at an unconscious level, even if they do not get consumers’ direct attention (Yoo 2007; 2008). Thus web ads would constitute the context in which product information is presented and could be processed unconsciously when consumers are incidentally exposed to them. Given that priming caused by mere exposure to a stimulus could affect attitude and behavior related to that stimulus at an unconscious level (Kunst-Wilson and Zajonc 1980), we propose that stimuli contained in web ads could possibly influence online consumers in their shopping decisions and behavior.

Additionally, we posit that web ads’ contextual effects could be contingent on their salience. As the web is a more task- and goal-oriented medium as compared to traditional media (Eighmey 1997), most consumers are preoccupied by their primary tasks when visiting the web. Thus online consumers tend to focus on their shopping tasks and ignore the stimuli in the web ads when they are of low salience. Even though web ads could result in implicit memory and trigger perceptual and conceptual fluency, the effects may not be strong enough to shape the consumers’ decisions and behavior. This is because contextual stimuli’s perceptual and conceptual effects require an adequate level of exposure frequency to operate (Berger and Fitzsimons 2008). Consumers’ visual attention to the web ad may increase when it is delivered in some more salient modes such as flash, pop-up, in-stream video and audio, interactive ad, and floating ad (Goldfarb and Tucker 2011). Although this may not lead to attentive and conscious processing of the web ad, the increased exposure to the web ad could strengthen the memory traces and concept activation resulting from the ad.

The influences from web ads could occur at perceptual and conceptual levels. A glimpse of web ads could produce a memory trace of the perceptual features of the stimuli in those ads (e.g., shape, color) (Shapiro 1999). The ease of processing of these features may make the products that also have these features stand out and be chosen by the online consumer. Hence, we have,

\textbf{H1: A salient web ad can exert perceptual influence on the consumer’s online shopping behavior such that the consumer is more likely to choose a product that has a perceptual link to the stimuli contained in the web ad.}

Exposure to web ads may also activate certain concepts related to the ads. The ease with which these concepts come to the consumer’s mind may affect how the consumer processes the information related to the primary shopping tasks. If a product’s features are related to the concepts activated, it would be more likely chosen by the consumer.

\textbf{H2: A salient web ad can exert conceptual influence on the consumer’s online shopping behavior such that the consumer is more likely to choose a product that has a conceptual link to the stimuli contained in the web ad.}

Additionally, the consumer may use the activated mind-set related to the contextual stimulus to encode product information, which in turn affect their product evaluation and choice. Consumer research has demonstrated that consumer preferences are unstable and can be significantly shaped by the activated mind-set (Zhu and Meyers-Levy 2009). Extending such contention to the online shopping context, we propose that exposure to web ads may trigger a particular mind-set which will in turn guide how the consumer processes the information of the focal product.
**H3:** A salient web ad can exert conceptual influence on the consumer’s online shopping behavior such that the consumer is more likely to employ the activated mind-set related to the web ad to evaluate and choose a product.

**Experiment 1**

**Design, stimuli, and procedure**

Experiment 1 was conducted to examine the effect of perceptual fluency on online consumers’ product choice (H1). The participants were supposed to gift their friend a customized t-shirt on his/her birthday. They were asked to order the t-shirt from T-Shirt Mania, a fictitious online t-shirt store created from the experiment.

T-Shirt Mania sold t-shirts based on users' own designs. Users first chose a color for the t-shirt and then added any text or image to design the t-shirt the way they wanted. Across all experiment treatments, upon entering T-Shirt Mania, the user would see an explanation on how to create their t-shirts and six different colored t-shirts that they could choose from. The order of the t-shirts (colors) was generated randomly. We manipulated the deployments of the web ads and created five versions of T-Shirt Mania. The baseline control version contained no web ad. We created two web ads with red and yellow stimuli respectively and delivered the ads in either a static or flash fashion, resulting in four additional versions (red vs. yellow x static vs. flash). Figure 1a and 1b show the screenshots of the online t-shirt store with red and yellow web ads.

159 university students were recruited for the study. Upon arriving at the study lab, they were given the instruction and randomly assigned across the five treatments. They were then engaged in self-paced browsing of the online store. After they had selected their preferred color online, they were told that they were not required to complete other t-shirt designing tasks. They were then given a questionnaire designed to check the manipulations (whether they saw any web ad on the website and whether they felt the web ad annoying and intrusive) and capture their product knowledge, gender, age range, etc.

**Manipulation and Control Checks**

Manipulation checks were carried out to make sure that subjects perceived the deployed web ads in accordance with our experimental manipulations. All subjects who were in the web ads conditions indicated the existence of web ads whereas all those who were in the non-ad conditions reported not seeing any web ads during the study. Additionally, subjects in the flash web ad conditions reported higher intrusiveness of the web ads than those in the static ad conditions ($M_{\text{static}}=2.55$, $M_{\text{flash}}=4.21$, $p<0.01$). Thus, our manipulations were successful.

We also performed control checks to ensure subjects in different conditions had equivalent backgrounds and demographic properties. We found no significant differences in subjects’ age, gender, production knowledge across different conditions.

**Preliminary Results**

Chi-square tests reveal that, in general, subjects were more likely to choose the color that was consistent with the color stimulus deployed in the salient web ads for their t-shirts. As shown in Table 1, compared to the no-ad condition where 3 subjects chose red t-shirt (9.68%), 12 (37.5%) subjects chose red t-shirt when a web ad with red stimulus was deployed in a flash fashion and 7 subjects chose red t-shirt when the red stimulus was deployed in a static web ad (21.88%). Statistically, Chi-square tests show that the red stimulus in the flash web ad significantly increased subjects’ choice of red as their preferred t-shirt color ($\chi^2 = 6.719$, $p < 0.01$). However, the effect of the red stimuli deployed through static web ad on color choice was not significant ($\chi^2 = 1.871$, $p = 0.17$). Additionally, although a more salient dynamic color stimulus was found to have a greater influence on the choice of color than the static one, the effect did not achieve statistical significance ($\chi^2 = 1.754$, $p = 0.185$).
The analyses of the yellow condition yielded similar patterns, providing evidence of the robustness of the observation pertinent to the red ad stimulus. As shown in Table 1, there were 2 (6.45%) subjects choosing yellow in the no-ad condition. 6 (18.75%) and 12 (28.13%) subjects chose yellow when the yellow stimulus was deployed in a static web ad and in a flash web ad, respectively. Statistically, Chi-square tests show that yellow stimuli in the flash web ad significantly increased subjects’ choice of this color as their preferred t-shirt color ($\chi^2 = 5.132, p = 0.023$). However, the effect of the color stimulus deployed through static web ad on color choice was not significant ($\chi^2 = 2.148, p = 0.143$). Additionally, we did not find that a more dynamic color stimulus could exert a greater influence on the choice of color than the static one ($\chi^2 = 0.784, p = 0.376$).

<table>
<thead>
<tr>
<th>Stimulus color</th>
<th>No ad</th>
<th>Static Ad</th>
<th>Flash Ad</th>
<th>No ad</th>
<th>Static Ad</th>
<th>Flash Ad</th>
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<tbody>
<tr>
<td>Stimulus color</td>
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<tr>
<td>Other colors</td>
<td>28</td>
<td>25</td>
<td>20</td>
<td>29</td>
<td>26</td>
<td>23</td>
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<tr>
<td>Percentage</td>
<td>9.68%</td>
<td>21.88%</td>
<td>37.50%</td>
<td>6.45%</td>
<td>18.75%</td>
<td>28.13%</td>
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</table>

Taken together, our experimental studies on web ads’ perceptual influence show that salient web ads can lead to perceptual fluency that will in turn affect consumers’ processing of their primary online shopping tasks.

**Experiment 2**

**Design, stimuli, pretest, and procedure**

The second experiment investigated whether conceptual connections between web ads and product features would affect online consumers’ shopping decisions due to conceptual fluency (H2). We created a hotel booking website for the study and the participants were told that they would be going on an overseas trip and need to book a hotel on the website. There were four hotel packages that satisfied their basic criteria like price, location, and so on. The hotels were presented in a random order. The participants were asked to book one that they preferred the most. The hotel packages had comparable prices, facilities and amenities but with different promotional offers. Two offers were manipulated as conceptual links to the web ads and the other two were fillers. One manipulated package offered guests an electronic luggage lock upon their check-in and the other offered complimentary spa treatment. For the corresponding web ads, one advertised an insurance company and one advertised a yoga course. The two web ads were displayed...
in either a static or flash mode. In total, there were five treatments in experiment 2, including the no-ad baseline condition, static insurance ad, flash insurance ad, static yoga ad, and flash yoga ad (see Figure 2a-d for experimental manipulations).

We expect that the insurance ad and the “lock” could activate the constructs such as “safety”, “security”, and “protection” whereas the yoga ad and spa treatment could activate the constructs such as “body”, “relaxation,” and “fitness.” The accessibility of these constructs through the priming of web ads would result in conceptual fluency, leading subjects to choose the hotels with lock offer when they are exposed to the insurance ad and the hotel with spa offer when exposed to the yoga ad.

We performed a pretest to ascertain that there would be a conceptual link between the insurance ad and the lock as well as the yoga ad and the spa treatment. As the slogans in the web ads contained the concepts (e.g., safety and protection in the insurance ad and relax in the yoga ad) explicitly, the pretest examined whether the product features could elicit similar concepts. 26 participants were recruited for two ostensibly unrelated studies. The first study asked subjects to proofread a short article (either describing different types of locks or introducing the history of spa) to manipulate their exposure to the concepts of lock and spa. In the second study, all subjects engaged in a word-fragment completion test to examine conceptual fluency. There were 12 words, including 4 distractor words and 8 target words (e.g., safety, protection, security for the lock scenario and body, relax, fitness for the spa scenario). The pretest showed that subjects’ completion rates for the target words were significantly higher if they had been exposed to the constructs related to those words (F=8.79, p<0.01 for lock and F=9.13, p<0.01 for spa) and thus validated the conceptual connections between the web ads and product features.

79 students in a large university participated in the experiment. Subjects were given the hotel booking instruction and randomly assigned across the five treatments. After they had decided on their preferred
hotel package, they completed a questionnaire to check the manipulations (whether they saw any web ad on the website and whether they felt the web ad annoying and intrusive) and capture their product knowledge, gender, age range, etc.

**Manipulation and Control Checks**

Manipulation and control checks were performed in a way similar to experiment 1. Results show that our manipulations were successful and there were no significant differences in subjects’ age, gender, production knowledge across the conditions.

**Preliminary Results**

Statistical analyses reveal that the stimuli deployed through salient web ads could significantly increase subjects’ choice of the product that had features conceptually related to contextual stimuli contained in the web ad. Specifically, as shown in Table 2, in the baseline condition where there was no web ad in the hotel booking web site, out of 15 subjects, only 1 subject (6.67%) chose the hotel package with luggage lock gift and 8 subjects chose the package with a complimentary spa treatment (53.33%). The rest 6 subjects chose the other two filler packages. When the web ad of an insurance company was presented in a flash fashion in the hotel booking website, 6 subjects chose that package (37.50%). When the same web ad was present in a static mode, 3 subjects (18.75%) chose that package. Statistically, the effect of the web ad presented in a flash fashion had a significant effect on the choice of hotel packages ($\chi^2 = 4.210, p = 0.04$). The effect of the static web ad on hotel package choice was not significant ($\chi^2 = 1.006, p = 0.316$). When the web ad of a yoga program was presented in a flash mode, 14 subjects chose the hotel package with a complimentary spa treatment (87.50%). When the same web ad was present in a static mode, 12 subjects (75.00%) chose that package. Statistically, the effect of the web ad presented in a flash fashion had a significant effect on the choice of hotel packages ($\chi^2 = 4.386, p = 0.036$). The effect of the static web ad on hotel package choice was not significant ($\chi^2 = 1.071, p = 0.301$).

<table>
<thead>
<tr>
<th>Table 2. Results of Experiment 2 on the Choice of Hotel Packages</th>
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<tr>
<td><strong>Wed ad with Insurance Stimulus</strong></td>
</tr>
<tr>
<td>No ad</td>
</tr>
<tr>
<td>Hotel package with luggage lock</td>
</tr>
<tr>
<td>Other packages</td>
</tr>
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<td>Percentage</td>
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Overall, the studies on web ads’ conceptual influence yielded findings similar to the studies on perceptual influence. We found that salient web ads can lead to fluent conceptual operation that will in turn influence consumers’ processing of their primary online shopping tasks.

**Experiment 3**

Experiment 3 aims to demonstrate the ability of a web ad to activate a mind-set that can guide a consumer’s product choice (H3). The experiment is designed in an online financial investment decision context. Studies have found that promotion and prevention are two important mental accounts that affect consumers’ investment decisions (Zhou and Pham 2004). The promotion mind-set focuses on the pursuit of desirable ends using an approach strategy. When it is activated, the individual tends to maximize the gains. The prevention mind-set attempts to achieve the desirable ends with an avoidance strategy. When it is triggered, the individual tends to avoid the losses (Higgins 1998). In the financial investment context, individuals with a promotion mind-set will be more sensitive to a financial product that could increase their financial gains, even though it may have higher risks. On the contrary, individuals with a prevention
mind-set will be more risk averse and favor a financial product with low potential losses, even though it may not generate high financial gains.

In experiment 3, subjects will be asked to evaluate and choose financial products from an online financial company. The products have differential potential gains and losses. We will manipulate the web ads to activate either a promotion or prevention mind-set. We expect that when subjects are incidentally exposed the web-ad that stresses the pursuit of gains (the avoidance of losses), they are more likely to choose the financial product that leads to greater investment returns (lesser investment losses).

We are currently in the process of designing the web ad stimuli, financial products, and the web site of the financial company.

Discussions

Theoretical Contributions

Our studies are among the first to conceptualize and examine the effects of web ads on consumers’ online shopping behavior. Thus far, major studies tend to isolate web ads from the web shopping environment that they are embedded in and focus on individuals’ perceptual and cognitive responses to web ads per se. As a departure, our studies recognize that the possible subtle influences that web ads could exert on consumers when they shop online by drawing on marketing research on perceptual and conceptual fluency. Given that information environments on the web are becoming increasingly complex, we believe the academia should provide systematic guidelines on the design and organization of various clusters of web information. Our studies will contribute to this endeavor. Additionally, our studies can draw researchers’ attention to the interplay between web ads and focal shopping tasks and inspire more studies in this direction. For example, contextual effects of web ads in an online environment can help other researchers further their research on online consumer behavior such as acceptance of personalized persuasion or impulsive buying.

Second, our studies also advance marketing and advertising literature. Internet marketing has been increasingly employed by companies as part of their marketing strategies although the debate about its effectiveness has never settled. While studies have observed that effects of web ads cannot be fully captured by click-through data and shown latent effects of web ads on the ease of processing of the stimuli contained in the web ads, our studies present another effect of web ads – they can be used as a priming cue to influence attitude toward and purchase decision regarding the focal product. To our knowledge, there have been few studies investigating the contextual effects of web ads on product evaluation and purchase in the marketing literature.

Practical Implications

The findings from our studies can cultivate an awareness of contextual effects of the web information environment on consumer behavior among e-commerce practitioners. We suggest that they should examine the information environment carefully and analyze the possible links between web ads and the focal online products. If the links could potentially lead to lower evaluation of the focal products, they should consider removing the link by changing either the web ads or the products. Moreover, they can also deliberately design and deliver the web ads to promote online shoppers’ evaluation and choice of the focal product.

Our studies also suggest that marketers may look beyond click-through data and implicit memory of web ads and brands when evaluating the effectiveness of web ads. Through creative designs, web ads can promote and facilitate consumers’ processing of primary tasks to achieve increased product evaluations and purchase decisions. Therefore, assessment of the effectiveness of web ads may also take into consideration of their impacts on primary shopping tasks. Moreover, web advertisers and product merchants can form certain alliance such that web advertising will be designed to improve the sales of the product presented in the primary task and part of the revenues earned from the increased sales could go to the advertisers.
Examining the potential effects of web ads on decision making in online shopping also has important practical implications for consumers. While our studies provide guidelines for practitioners to design and implement web information environments by capitalize on contextual effects of web ads on online consumers’ purchase behavior, it may not be beneficial to consumers. Therefore, our studies also suggest that consumers should be educated and cautioned against the possible effects of secondary information that could lead to suboptimal decisions.

**Future Research Directions**

It should be noted that the subjects in our experiments were exposed to web ads incidentally. Although we have not monitored their allocation of visual attention to web ads directly, we probed their perception of the effect of web ads in the post-experiment questionnaire. The means of subjects’ agreement to the statement that the web ads had influenced their product choice (measured with 5-point likert scale) ranged from 1.90 to 2.30, indicating that subjects generally did not believe that their decisions had been affected by web ads. Studies have shown that marketers’ attempts to influence consumers will be more effective when the consumers are unaware of such influence (Friestad and Wright 1994). However, if consumers are aware of the marketers’ motives, either because the consumers have sufficient cognitive resources or the marketers’ motives are accessible, the attempts will fail (Campbell and Kirmani 2000). These studies suggest that there could be boundary conditions for the perceptual and conceptual effects of web ads on consumers’ online shopping. For instance, if the perceptual and conceptual links between web ads and the focal products are very obvious, the consumer may develop suspicion of the marketer’s ulterior motivation. When such suspicion arises, the consumer may even exhibit reactance to the marketer’s attempt by generating negative evaluation of and not choosing the focal product. We are developing a research project to investigate the boundary conditions of the contextual effects of web ads.

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**References**

eMarketer 2012. *US Online Advertising Spending to Surpass Print in 2012*,


