

# The Effects of Sponsored Links on Consumers' Information Processing Behavior in Comparison Shopping Engines

Yan Lu  
School of Business  
The University of Hong Kong  
Pokfulam, Hong Kong  
isabellu@business.hku.hk

Michael Chau  
School of Business  
The University of Hong Kong  
Pokfulam, Hong Kong  
mchau@business.hku.hk

## Abstract

*Comparison shopping sites facilitate consumers' pre-purchase evaluation of alternatives, and draw increasing traffic to merchants' Web sites. As the main source of revenue, sponsored link advertising has become one of the most important aspects for comparison shopping services. However, little is known about the effectiveness of sponsored links and their effects on consumers' information processing behavior. In this study, we develop a research model that tries to explain the influence of information presentation on the main stages of consumers' information processing. The consumer decision process theory from the marketing literature and the information processing theory from social cognition research are employed to develop our model. We also propose that the attitude towards Web advertising will have direct and interaction effects on consumers' information processing behavior. Nine research hypotheses are postulated and will be tested in controlled experiments.*

**Keywords:** Information Representation, Attitude towards Web Advertising, Sponsored Links, Comparison Shopping, Human Information Processing

## 1. Introduction

As more consumers find it convenient and comfortable to make purchases on the Internet, the number of online shopping sites continues to rise. Comparison shopping search engines not only find the products a user is looking for, but at the same time provide a list of comparisons in order for the user to find a discount, compare prices and features from competitors, and finally make a purchase. This kind of sites has been exerting an increasing influence not only on online shopping, but also on purchases made in stores. Nielsen/NetRatings report for August 2003 shows that 16 percent of U.S. active Internet users, or more than 21 million online users, checked with comparison shopping sites, up 34% from a year earlier.

Comparison shopping sites catch attentions from both consumers and merchants. Using these special engines, consumers can easily get the product information across many merchants through either a catalog-style index or a product keyword search and subsequently compare the attributes which they care about. Comparison shopping sites also offer platforms for merchants to get their products known by potential buyers and thereafter obtain increasing traffic to their Web sites. As a free search engine for online users, the main revenue for comparison shopping service comes from sponsored link advertising. Sponsored link advertising is a mechanism where the search engine guarantees placement on the result page for specific search terms to merchants who agree to pay a certain fee for this service. Advertisers pay the fees only when a user clicks

on their sponsored links. Offering a greater probability of attracting interested buyers, this service drives higher traffic to the providers' Web sites. However, since a greater number of paid links decrease the credibility of search engines and hence their traffic, most search engines offer only a few slots for paid placement links (Goodman 2000). For users to click on a certain sponsored link, the link needs to get noticed and considered. Given this situation, the representation (e.g. placement and type) of sponsored links is an essential factor that will influence the effects of the sponsored links on online users. On the other hand, the attitude of consumers towards the sponsored link might have impact on their processing of the advertisement information. As sponsored link advertising has become one of the most important businesses for leading e-commerce companies, it is crucial to determine the effectiveness of sponsored links on attracting users' attention.

## **2. Theoretical Background**

### ***2.1 Information Representation***

Many previous studies on sponsored links have verified that users pay different amount of attention to sponsored results displayed in different positions in a page. Most of the sponsored links are placed in two parts of the result page — on the right side of the page or at the bottom of the page (under the search results). Hotchkiss et al. (2005) conducted a survey study with 425 respondents and found that many searchers visually ignored or did not see the sponsored listings, partly due to their screen resolution. In some cases, search engines mixed the sponsored links among the organic links with or without clear identification. Findings of Jansen and Resnick (2005) suggest that there is a strong preference for organic links and a bias against sponsored results, and that more than half of the time, the title of the sponsored link determines searchers' perceived relevance.

The study of information presentation has long been of great interest to researchers. In a study of general Web searching and evaluation of Web results, Tombros, Ruthven, and Jose (2005) studied 24 participants, each of whom performed three information-seeking tasks. The researches reported that there were 5 categories (text, structure, quality, non-textual items, and physical properties) used by the searchers to determine the utility of Web documents. Relevant to the "search", "evaluation" and "choice" stages is research that has assessed the impact of information format on consumers' collection and processing of information (Lurie 2004; Painton and Gentry 1985; Sethuraman et al. 1994). They demonstrated that online marketers must consider the effects of information format and decision rules consumers use when engaging in the decision-making process online.

### ***2.2 Attitude towards Web Advertising***

Attitude is an important concept in marketing science and practice. It can be defined as a person's internal evaluation of an object such as an advertisement (Mitchell and Olson 1981). Consumers' attitude towards advertising has been considered important to track because it likely influences consumers' exposure, attention, and reaction to individual advertisements (Alwitt and Prabhakar 1992) through a variety of cognitive and affective processes (Lutz 1985). Previous studies show that attitude towards advertisements has a strong mediatory effect on advertising effectiveness (Mitchell and Olson 1981; Bruner and Kumar 2000; Stevenson et al. 2000). It may influence consumers' behavior in processing information of relevant products. Studies have also

identified a strong positive relationship between attitude towards the advertisements and brand attitude, which in turn is positively related to purchase intention. The likeability, as Franzen (1997, p. 125) pointed out, “is not a guarantee for persuasion, nor is it absolutely necessary or sufficient to achieve it, but likeability certainly can reinforce the effect of advertising”. However, previous empirical studies or surveys have shown that many users have biases towards or against sponsored links, which will affect their effectiveness for businesses or organizations in attracting potential customers (Langford 2000; Hotchkiss et al. 2005). Obviously, the biases will influence consumers’ behavior during the process of searching and browsing in the context of comparison shopping Web sites.

### 3. Research Model and Hypotheses

#### 3.1 Research Model

According to consumer decision process (Blackwell et al. 2001) the general online purchase process consists of four main stages: need recognition, search for information, pre-purchase evaluation of alternatives, and purchase. Comparison shopping Web sites, as introduced above, enable customers to complete the stages of “search for information” and “pre-purchase evaluation of alternatives” at the same time. Given the special context of this research, we adopt the information processing model which has three main stages: attention, cognitive processing, and evaluation. Ducoffe (1996) demonstrated that attitudes towards Web advertising were directly dependent on advertising value and perceived levels of entertainment. He further identified entertainment, informativeness, and irritation as factors contributing to consumers’ evaluations of advertisement values and thus attitudes toward advertisements. Brackett and Carr (2001) confirmed Ducoffe’s model and furthermore include credibility and consumer demographics. In our research we plan to utilize a survey to obtain users’ attitude towards Internet by asking about both their overall impressions of Internet advertising and their perceptions of different related dimensions. Based on the information-processing model, we establish our research model as shown in Figure 1.

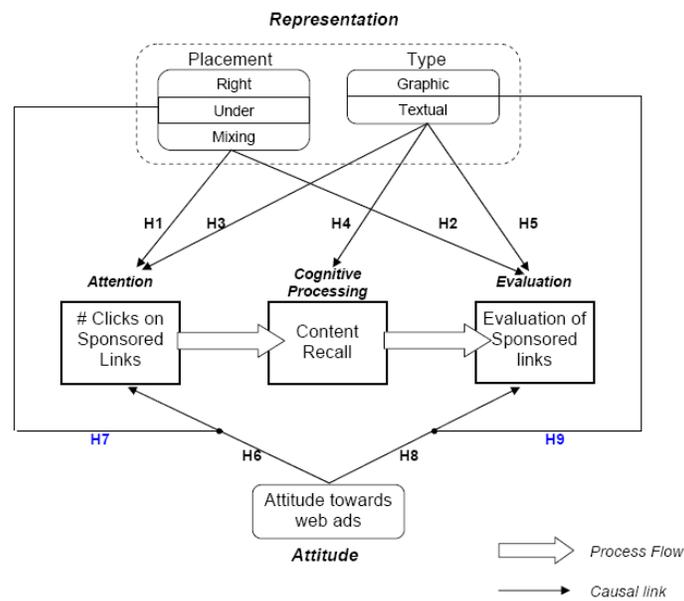


Figure 1. Research Model

### 3.2 Hypotheses

Visualization research suggests that the effectiveness of drawing attention depends on both the salience of visual objects and the relevance to the search tasks. Salience in this theory can be defined as the phenomenon where one's attention is differentially directed to portions of the environments (Taylor and Thompson 1982). Research in human vision and perception suggests that the distance of an object from the area of focal attention can determine the amount of attention it receives (Anstis 1974). Also, based on the similarity-based theory (Duncan and Humphreys 1989), placing advertising links within the context of the editorial results might cause a greater amount of clicks on those advertising links. Therefore, we propose that the different placements of sponsored links will catch the attention of users by different extent.

*H1a: Users pay more attention to sponsored links when they are listed on the right side of the organic links than when they are listed under the organic links.*

*H1b: Users pay more attention to sponsored links when they are listed among the organic links than when they are listed on the right side of the organic links.*

Several recent studies show that there are considerable amount of users who have bias on sponsored links that are not labeled with distinguishable hints (Mowshowitz & Kawaguchi 2002; Nicholson et al. 2006). Usually, as links without distinguishable hints are mixed among organic results, users will see these links easily. On the other hand, putting sponsored results under all of the organic listings will tremendously reduce the possibility for them to be noticed by consumers. Based on this reasoning, the following hypothesis is postulated:

*H2: The placement of sponsored links will have effects on users' evaluation on the links themselves (i.e. mixing sponsored links causes the lowest evaluation, followed by right-side links).*

In general, consumers appear to prefer graphical interfaces with pointing and clicking, which make it easier to navigate a site and find what they want. According to visualization research, attention can be involuntarily captured by objects contrasted with the background in any of the basic visual features such as color, size, or motion. Advertisements with graphical presentation have strong effect on consumers' information processing behavior. They are more likely to capture users' attention than simple textual ones because of their salience in terms of color and visual image. They direct one's attention to where they are located (Taylor and Thompson 1982); and thus are more likely to be noticed and be clicked. Therefore, we propose the following hypothesis.

*H3: Users are more likely to click sponsored links with graphical content than those with textual content.*

Moreover, recall has traditionally been used in IS research as a dependent variable measuring the effectiveness of information transmission by different system interface designs (DeSanctis 1984; Large et al., 1994; Umanath et al. 1990) and is used as an indicator to measure the quality of attention. We propose that graphical sponsored links, with great salience, will lead to higher recall performance.

*H4: Recall of sponsored product information will be higher if it is represented by graphical content than textual content.*

Furthermore, graphical listings are found to be more interactive and entertaining, and Ducoffe (1995, 1996) identified entertainment as one of the factors contributing to consumer's evaluation of advertisement values. Hence we propose the following hypothesis.

*H5: Users evaluate graphical sponsored links higher than textual links.*

The attitude towards advertising has been widely studied by researchers. These studies suggest that attitude toward advertising influences consumer processing of advertising and is an important determinant of responses to individual advertisements (James & Kover, 1992; Ducoffe, 1996; Brackett & Carr, 2001). Because the cognitive processing stage is not normally affected by affective factors, we will focus on the effect of attitude on the other two stages: attention and evaluation. Previous studies show that people who have a favorable attitude towards advertisements are more likely to have a high level of involvement with specific advertisements and vice versa (James & Kover, 1992). Accordingly, we proposed that:

*H6: Users who have a favorable attitude towards Web advertisements are more likely to click the sponsored links than those who have a less favorable attitude towards Web advertisements.*

Once users have less favorable impression on the sponsored links, they will turn to the organic results immediately without clicking the sponsored links for further information even if the links are located in a salient spot of the Web page. On the contrary, people with more favorable attitude towards Web advertisements may consider the sponsored links to be relevant and useful. This reasoning leads to the following hypothesis:

*H7: There is an interaction effect between attitude towards Web advertisements and the placement of sponsored links in attracting users' attention, with placement having a more salient effect on users with less favorable attitude towards Web advertisements than on users with favorable attitude towards Web advertisements.*

Moreover, attitude towards advertising was found to influence the evaluation of individual advertisements. When consumers have a more favorable attitude towards advertisements, they are more likely to evaluate individual advertisements as informative, fun and acceptable (Lutz 1985; Cho 2003). Accordingly, the following hypothesis is generated:

*H8: Users who have a favorable attitude toward Web advertising overall evaluate the sponsored links more highly than users who have a less favorable attitude toward Web advertisements do.*

Many users tend to ignore advertisements when surfing online. They prefer to visit sites having simpler layouts with fewer graphics, quicker loading time, and easier-to-use interfaces (Evans et al., 2001). Especially for users who have negative attitude towards Web advertising, the delay caused by sponsored advertisements leads to even worse evaluation on the advertisements. Accordingly, the following hypothesis is postulated.

*H9: There is an interaction effect between attitude towards Web advertisements and the type of sponsored links on consumers' evaluation, with type having a more salient effect on users with less favorable attitude towards Web advertisements than on users with favorable attitude towards Web advertisements.*

## **4. Methodology**

### ***4.1 Design, Subjects, and Experimental Systems***

A lab experiment using a 3×2 between-subject full-factorial design will be conducted. The two independent variables are the placement of sponsored links (right-side links versus bottom links versus mixed links) and the type of sponsored links (graphical versus textual). The subjects will be randomly assigned to each of the six experimental conditions. A simulated comparison

shopping Web site will be designed for experiment. Each subject will be required to complete several information searching tasks on the site.

#### ***4.2 Independent Variables, Dependent Variables, and Control Variables***

*Overall Attitude towards Web Advertising:* At the beginning of the experiment, subjects will be arranged to fill in a questionnaire regarding their overall attitude towards Web advertising. Cho (2003) used eight five-point Likert items (four instrumental and four affective items) to measure overall attitude toward Web advertising. *Placement:* To manipulate the effect of placement, sponsored links will be put on the right side of organic links or under the organic ones or mixed with the organic ones. Subjects will be exposed to links listed in different locations with distinguishable identifications. The amount of links in each location will be the same. *Type of Sponsored Links:* Two types of sponsored links, graphical and textual, will be developed for the experiment Web site. The size of each link will be the same as the others according to their specific conditions. For each type of links, products of the same categories will be designed as either graphical or textual. All sponsored links will contain information of the same attributes.

*Attention:* The dependent variable in measuring the effectiveness of sponsored links in capturing attention is the total number of clicks on the sponsored links. *Recall:* Recall of sponsored products information will be assessed as the recall of brand names and images. The score for recall of brand names and images will be calculated by counting the number of correct identifications in each product category and then taking the average. *Evaluation of Sponsored Links:* We will use a post-session questionnaire to get the subjects' evaluation on the usefulness of sponsored links.

We will conduct a pilot study to identify a certain amount of product categories and brands of products to be used in the experiment. All product information will be kept constant in all the experimental conditions. Multiple methods will be used to control for the effects of possible confounding variables and increase the internal validity of this study.

### **5. Data Analysis and Expected Outcomes**

By calculating and comparing the statistics of experiment, such as the accurate rate of searching tasks, and the average number of clicks per shopping trip in browsing tasks compared with that in searching tasks, we can check the manipulation of our experiment. To do the control checks, we will perform a multivariate analysis of variance (MANOVA) test. Statistical tests also will be performed to see if there are any systematic biases on the dependent variables due to subjects' experience with personal computers, the Internet, and online shopping. Statistical methods will be performed to test the hypotheses. By conducting this research, we expect to find out how consumers react to sponsored links and how a sponsored link can be more effective in terms of better placement and type. We also can better understand the effects of attitude towards Web advertisements on consumers' online shopping behavior in the context of comparison shopping Web sites.

### **References**

1. Anstis, S.M. "A chart demonstrating variations in acuity with retinal position," *Vision Research*, (14:7), 1974, pp. 589–592.
2. Brackett, L. K. and Carr, B. N. "Cyberspace Advertising vs. Other Media: Consumer vs. Mature Student Attitudes." *Journal of Advertising Research*. (41:5), 2001, pp. 23-33.

3. Blackwell, R. D., Miniard, P. W., and Engel, J. F. *Consumer behavior*, 9th ed. South-Western: Thomson Learning.2001
4. Bruner II, G. C., and Kumar, A. "Web Commercials and Advertising Hierarchy of Effects", *Journal of Advertising Research*, (40:1/2), 2000, pp. 35-44.
5. Cho, C. H., "Factors Influencing Clicking of Banner Ads on the WWW," *CyberPsychology & Behavior* (6:2), Mary Ann Lievert, Inc., 2003.
6. DeSanctis, G. "Computer graphics as decision aids: Directions for research." *Decision Science* (15:4), 1984, pp. 463-487.
7. Duncan, J., and Humphreys, G. W. "Visual search and stimulus similarity." *Psychological Review*, 96, 1989, pp. 433-458.
8. Evans, M., Wedande G., Ralston L. and Selma V. H. "Consumer interaction in the virtual era: some qualitative insights," *Qualitative Market Research* (4:3), 2001, pp. 150-159.
9. Franzen, G. *Advertising Effectiveness: Findings from Empirical Research*. Admap, Oxfordshire, 1997.
10. Goodman, A., Why search engines must continue to be referees. [www.traffick.com](http://www.traffick.com), November 2000.
11. Hoffman, D.L., and Novak, T.P. "Marketing in hypermedia computer-mediated environments: Conceptual foundations," *Journal of Marketing* (60:3), 1996, pp. 50-68.
12. Hotchkiss, G., Inside the Mind of the Searcher, Accessed on 15 March 2005 on the World Wide Web at <http://www.enquiro.com/research.asp>.
13. James, W. L., and Kover, A. J. "Observations: do overall attitudes toward advertising affect involvement with specific advertisements?" *Journal of Advertising Research* (32), 1992, pp. 78-83.
14. Jansen, B.J., and Resnick, M. "Examining Searcher Perceptions of and Interactions with Sponsored Results," Paper Presented at the Workshop on Sponsored Search Auctions at ACM Conference on Electronic Commerce (EC'05), 5 - 8 June 5, Vancouver, BC, Canada. 2005.
15. Langford, B.E., "The Web Marketer Experiment: a Rule Awakening," *Journal of Interactive Marketing* (14), 2000, pp. 40-48.
16. Lurie, N. H. "Decision Making in Information-Rich Environments: The Role of Information Structure," *Journal of Consumer Research* (30:4/March), 2004, pp. 473-486.
17. Lutz, R.J. "Affective and cognitive antecedents of attitude toward the ad: a conceptual framework," In: Alwitt, L.F., Mitchell, A.A. (eds.). *Psychological processes and advertising effects*. Hillsdale, NJ: Lawrence Erlbaum, 1985, pp. 45-63.
18. Mowshowitz, A., and Kawaguchi, A. "Assessing bias in search engines." *Information Processing and Management*, (35:2) 2002, pp. 141-156.
19. Mitchell, A. A., and Olson, J. C. "Are Product Attribute Beliefs the Only Mediator of Advertising Effects on Brand Attitude?" *Journal of Marketing Research*, (18:3), 1981, pp. 318-332.
20. Nicholson, S., Sierra, T., Eseryel, U. Y., and Park, J. H., and Barkow, P., Pozo, E. J., and Ward, J. "How Much of It is Real? Analysis of Paid Placement in Web Search Engine Results," *Journal of the American Society for Information Science and Technology* (57:4), 2006, pp. 448-461.
21. Painton, S., and Gentry, J. W. "Another Look at the Impact of Information Presentation," *Journal of Consumer Research* (12:2), 1985, pp. 240-244.
22. Sethuraman, R., Cole, C., and Jain, D. "Analyzing the effect of information format and task on cutoff search strategies," *Journal of Consumer Psychology* (3:2), 1994, pp. 103-136.
23. Simeon, R. "Evaluating domestic and international Web-site strategies," *Internet Research: Electronic Networking Applications and Policy* (9:4), 1999, pp. 297-308.
24. Stevenson, J. S., Bruner II, G. C., and Kumar, A. "Web Page Background and Viewer Attitudes," *Journal of Advertising Research* (20:1/2), 2000, pp. 29-34.
25. Tombros, A., Ruthven, I., and Jose, J. M. "How users assess Web pages for information seeking," *Journal of the American Society of Information Science and Technology* (56), 2005, pp. 327-344.
26. Reed, S. "Online shopping? You Bet!" *Infoworld* (21:43), 1999, 91.
27. Umanath, N. S., Scamell, R. W., Das, S. R., "An examination of two screen/report design variables in an information recall context." *Decision Science*, (21:1), 1990, pp. 216-240.
28. Webster, J., Trevino, L. K., and Ryan, L., "The dimensionality and correlates of flow in human-computer interaction," *Computers in Human Behavior* (9), 1993, pp. 411-26.