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This article analyzes clickstream data collected from a popular online retailer to observe actual consumers’ information search behavior considering both gender and product categories. The results show, compared to males, females tend to be comprehensive processors, searching for more product information including customer reviews and using an assistant agent more while shopping online. Besides, unlike males, females use both customer reviews and the assistant agent significantly more when shopping for experience goods than when shopping for search goods. These results will help academics and practitioners to understand and predict consumer behavior better in the online context.

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ABSTRACT

This article analyzes clickstream data collected from a popular online retailer to observe actual consumers’ information search behavior in terms of both gender and product categories. The results show that, compared to males, females tend to be comprehensive processors, searching for more product information including customer reviews and using an assistant agent more while shopping online. Also, unlike males, females use both customer reviews and the assistant agent significantly more when shopping for experience goods than when shopping for search goods. These results will help academics and practitioners to have a deeper understanding in consumer behavior in the online context.

INTRODUCTION AND BACKGROUND

With the advance of Internet accessibility and the reduction in service delivery costs, online shopping has continued to grow over the past years. In 2005, the volume of consumption through online retailing in the United States rose by more than 20% compared to 2004 (Mulpuru, Johnson, and Tesch 2006), and reached $100 billion in 2006, indicating that the Internet has emerged as a significant marketplace today (Cassidy 2007).

As more and more consumers visit the Internet to shop, researchers have explored various characteristics of the Internet to observe their influences on consumer behavior in the online shopping environment. Many studies have addressed that the most commonly cited reason that consumers purchase online is the widespread availability of information on the Internet (Wolfinbarger and Gilly 2001). In addition to the voluminous information, online retailers also enable consumers to have interactive experience by providing shopping aids, such as customer reviews or assistant agents. The abundant information and the interactive experience seem to enable the Internet to realize the expectation that it would become an important retailing channel.

Even though the growth of the online marketplaces appears to be evident, both academics and marketing managers argue that consumers are still reluctant to shop on the Internet. Researchers said that, contrary to the traditional shopping environment, consumers perceive greater risks toward online shopping due to limited physical contact with products or services (Korgaonkar and Wolin 2006). According to Korgaonkar et al. (2006), consumers are especially less willing to purchase experiential products online, because they are unable to determine the product quality prior to the actual purchase (Nelson 1974). In addition, several researchers suggest that the perceived risks are significantly affected by personal factors such as gender (Kehoe, Pitkow, and Morton 1997). Kehoe et al. (1997) said that since females have higher levels of computer anxiety and are more emotionally vulnerable to lack of interaction with other people, they tend to perceive greater risks toward online shopping than men and become reluctant to shop and purchase online.

Past studies imply that both product characteristics and gender are important factors that influence online shopping and purchasing. However, there has been little research into the influence of gender and product characteristics on consumer behavior in the online shopping context. As a result, despite prior research efforts, less is known about how males and females differ in their information search behavior in the online shopping process. Since understanding consumers’ information search behavior is critical to provide consumers with better shopping experience, the primary objective of this research is to examine gender differences in information search behavior in the online channel and to show how gender differences are manifested in shopping for different types of product categories.

LITERATURE REVIEW AND HYPOTHESES

Gender Differences in the Variety of Information Search

A commonly cited theory related to gender differences, the selectivity model (Meyers-Levy 1989; Meyers-Levy and Maheswaran 1991; Meyers-Levy and Sternthal 1991) describes gender differences in the information process. According to this model, males are regarded as ‘selective processors’, while females are considered ‘comprehensive processors’ in terms of information processing. That is, males acquire information in a heuristic fashion, therefore missing subtle cues, whereas females tend to engage in an effortful, comprehensive and itemized analysis of all possible information.

Several studies have observed gender differences in the consumer shopping context as well. Campbell (2000) proposed the principal ideological differences between males and females in the context of shopping. He said that males generally view shopping as something that is ‘needs-driven’, so they tend to form negative attitudes toward it. Additionally, they see it as a work to be accomplished with minimum input of time and effort. On the other hand, females consider it enjoyable and associate it with a leisure frame and form highly positive attitudes. Corresponding to previous research on the information search process, several studies centered on the shopping context found that, unlike females, males simplify the shopping process by attending to a smaller number of information sources, with the intention of obtaining the actual goods with the least “fuss” (Laroche, Saad, Cleveland, and Browne 2000). Following the previous research on gender differences in the information search process, we expect that females would search for more information by visiting a greater number of product pages than males would in the online shopping process. Therefore, the first hypothesis follows:

H1: Compared to males, females are likely to search for more information by visiting more product pages in the online shopping process.

Gender Differences in Social Interaction

According to Carlson (1971), males are more likely to be guided by agentic goals, whereas females may be guided by communal goals. Specifically, studies on gender differences in motivational orientation found that males are motivated by achievement needs and directed towards individualistic tasks (Venkatesh and Morris 2000). Males are also more likely to be independent or assertive (Venkatesh et al. 2000), while females are more sympathetic and prefer harmony (Briton and Hall 1995). Also, Meyers-Levy (1989) further suggested that these gender differences in the goal orientation have a significant effect on information processing.
Especially, females are generally more willing to share personal information and change their behaviors through interactions with others compared to males (Bramson 1999).

Unlike the direct face-to-face relationships between sellers and buyers in the traditional shopping context, the relationship in the online context is between buyers and the mediated environment, resulting in lack of social interaction. Instead of physical contact with products and face-to-face interactions with a salesperson in the brick-and-mortar retailers, online retailers try to offer similar experiences through interactive decision aids such as customer reviews and an assistant agent. Customer reviews are defined as a type of product information created by users based on their own experiences, working as sales assistants to help consumers identify the products that best match their expected usage conditions (Chen and Xie 2004). Acknowledging the interactive characteristics of customer reviews, Chen et al. (2004) stated that customer reviews are a new element of marketing communications.

Abundant research has stated that salespersons play an important role in the market place. Specifically, Meyer (1990) suggested two distinct benefits of consumers’ interaction with salespersons. Firstly, the functional benefit is defined as a consumer’s desire to get help from a salesperson to fulfill his or her needs. Also, researchers argue that the social aspects of a customer-salesperson relationship are critical as much as the functional benefit (Czepliel 1990) since customer’s emotional reactions to a personal interaction with a salesperson may influence the customer’s overall satisfaction with the purchase experience (Westbrook 1981) and future purchase intentions (Babin 1995). In the online context, a salesperson is not physically present, even though a help from salespersons is indeed necessary. In order to resolve consumers’ frustrating experience caused by the lack of salesperson’s assistance, online retailers provide an assistant agent to enhance consumers’ shopping experience by responding consumers’ inquiries and requests. Importantly, this agent also provides consumers with a kind of social interaction with salespersons, allowing the consumers to ask for information about their orders, products or services on the website.

Given that distinct goal orientations generate the gender differences in the information processing, we assume that females will be more likely to interact with other consumers through customer reviews and an assistant agent.

H2a: Compared to males, females are likely to read customer reviews on products or services more in the online shopping process.

H2b: Compared to males, females are likely to use an assistant agent more in the online shopping process.

Gender Differences in the Perceived Risks

One stream of research on gender differences has addressed that specifically females perceive greater risks in a wide variety of domains (Garbarino and Strahilevitz 2004). In the online context, researchers have also found that females tend to perceive greater risks toward online purchasing (Garbarino, et al. 2004). As consumers are less willing to purchase when they perceive more risks (Shimp and Bearden 1982), results from previous studies indicate that women are less willing to purchase online and spend less money than men (Allen 2001), while men perceive the characteristics of online shopping more favorably than women (Slyke, Comunale, and Belanger 2002).

With the purpose of exploring the influence of the characteristics of products or services on the consumer information search process, researchers have categorized products in terms of whether the quality of goods or services can be verified prior to purchase. Most commonly cited, Nelson’s (1974) theory suggests two product categories: search goods and experience goods. Search goods refer to products or services for which the most critical attributes can be evaluated before purchase. On the other hand, experience goods are products or services for which the cost to evaluate the most essential attributes is so high that direct experience is often the evaluation method with the lowest costs in terms of time, money, cognitive effort, or other resources (Nelson 1974).

Although the Internet enables consumers to search for enormous information, the Internet interrupts consumers’ experiences involving the sense of touch or feel (Burke 1997). According to Korgaonkar, Silverblatt, and Girard (2006), the perceived risks are greater for experience goods than for search goods because of this limited experience like directly touching or feeling products in the online environment.

Since female customers tend to perceive greater risks than males, and the risks are even enhanced when shopping for experience goods than when shopping for search goods, we believe that females would read more customer reviews and use an assistant agent more frequently when shopping for experience goods than when shopping for search goods. We propose the following:

H3a: Compared to males, females are likely to read customer reviews more when shopping for experience goods than when shopping for search goods in the online shopping process.

H3b: Compared to males, females are likely to use an assistant agent more when shopping for experience goods than when shopping for search goods in the online shopping process.

METHOD

Data Collection

When a consumer visits several pages of an online retailer, the separate records of those pages construct a “path”, sometimes called “clickstream” in the form of a log file. This clickstream data includes information about each customer’s ID, requested pages, visited time, software connected through, and personal information such as the email address and name. Based on the information involved in the clickstream data, we can directly observe what kinds of pages consumers visit while shopping online. For this reason, researchers commonly analyze the clickstream data to examine consumer behavior on the Internet (Bucklin, Bell, and Sismeiro 2000).

Online retailers collect records of visits by all customers on visits in their database. The information provided by this data is quite realistic, companies are often reluctant to provide data due to customer privacy. Fortunately, however, seeing the significance of our research, the online retailer that we contacted provided us with their data, given the condition that consumer privacy is protected. The online retailer providing the data opened the online website in August 2001, and became one of the biggest online retailers in Korea, earning more than $108 million in 2006. Similar to one of most popular online retailers in the US, Amazon.com, the online retailer places various products and services ranging from electronics to groceries.

We asked for all records of pages that customers have viewed during a month from July 1 through July 31 in 2006. In order to make the data usable for our research, we went through several steps of dividing the data into analyzable forms. Since we focus on the information search behavior during each visit to the online retailer, we divided the whole data into individual visits by each consumer, which are called “sessions.” Practitioners often define a session...
The Effect of Gender and Product Categories on Consumer Online Information Search

when a consumer is inactive for a certain amount of time. The online retailer that provided the data also defined each session by 60 minutes of inactivity. In this basis, we first separated the data into a set of sessions of each visitor, and then kept only one visit for each consumer to make the data more representative. We also deleted data containing less than five pages, because it is meaningless to examine those data including little information. Finally, after preprocessing the data, we matched them with the customer demographic file to identify consumer information.

Measurement

**Independent Variables**

**Gender.** To compare the information search behavior in the online shopping context between males and females, we included gender information in the preprocessed data, denoting gender by 0 or 1 (0=female, 1=male).

**Product Category.** In order to observe the effect of product characteristics in the online retailers, we chose two product categories: clothing and electronic appliances including personal computers. These two product categories are most frequently purchased in the online retailer. Also, Girard, Silverblatt, and Korgaonkar (2002) categorized personal computers as search products and clothing as experience goods. Consistent with this categorization, we selected clothing for experience goods and electronic appliances including personal computers for search goods. We denoted the electronic appliances category by 1 and the clothing category by 2.

**Dependent Variables**

**Pageviews.** Studies that analyzed clickstream data commonly measure pageviews, the number of pages viewed, to observe consumer information search behavior. Similarly, we measured the number of product pages that the consumers visited to measure the variety of information search.

**Customer Reviews.** To identify how males and females rely differently on customer reviews, we counted the number of customer reviews that a consumer read during a session. Therefore, a greater number of customer reviews implies a higher tendency to rely on customer reviews.

**Assistant Agent.** For the purpose of observing gender differences in the use of an assistant agent, we counted the number of clicks on an assistant agent to request information about the products or services. The result implies that the greater the number of clicks on an assistant agent is, the more consumers request for assistants.

**RESULTS**

**Sample Description**

Over a period of a month, 377,797 visits were recorded in the database of the online retailer, but only 890 data items, consisting of 618 females and 272 males who visited clothing and electronic appliances categories, satisfied our criteria and were included in the data analysis. According to the statistics of total visitors to the retailer, 59.4% of the visitors were females and the average age of the visitors was 39. Because females are generally more interested in the clothing category (Zhou, Dai, and Zhang 2007), the final data includes a higher percentage of females than the average of total visitors. Specifically, 151 females and 155 males were examined in the electronic appliances category, whereas 467 females and 117 males were considered for clothing category.

**Hypothesis Testing**

To investigate gender differences in the variety of searching for information in the online context, we first compared the numbers of product pages visited between males and females. As expected, the number of product pages visited by females differed significantly from that of males (Mmales=5.73, Mfemales=8.36). An ANOVA showed that the mean of the number of products that viewed for females was greater than that of males (F(1,888)=9.707, p<.003).

Secondly, we observed gender differences in the use of decision aids. Hypothesis 2a suggests gender differences in the utilization of customer reviews in the online shopping process: females will read more customer reviews than males. The result shows that females actually used customer reviews significantly more than males (Mmales=.91, Mfemales=5.83, F(1, 888)=26.247, p<.001). Additionally, females were also more likely to read customer reviews than males. While 21.7% of males read customer reviews, 46.3% of females did so (χ²=48.100, p<.001). Hypothesis 2b addresses gender differences in the use of an assistant agent in the online shopping process. The results show that females asked for help more often than males do (Mmales=0.67, Mfemales=1.17, F(1, 888)=7.174, p<.009). Furthermore, females were more likely to use an assistant agent than males (Mmales=19%, Mfemales=29%, χ²=9.244, p<.004). As we have hypothesized, females used customer reviews as well as an assistant agent more frequently than males.

Finally, we observed the interaction effect of gender and product categories on consumer information search behavior. According to the results of an ANOVA analysis, females read more customer reviews when shopping for experience goods than when shopping for search goods (Mexperience=4.42, Msearch=2.01). On the other hand, there was no difference in the use of customer reviews for males across product categories (Mexperience=.91, Msearch=.91). This interaction effect (F(3, 886)=12.488, p<.001) implies that only females were sensitive to product categories when shopping online (figure 1). By comparing the percentage of online shoppers’ use of customer reviews across two product categories, we also found that females were more likely to read customer reviews when shopping for experience goods than when shopping for search goods (Mexperience=.49%, Msearch=.35%, χ²=10.044, p<.003). Again, unlike females, males did not show significant difference in the willingness to rely on customer reviews across product categories (Mexperience=24.8%, Msearch=19.4%; χ²=1.158, p>.301). Lastly, we observed gender differences in the use of an assistant agent when shopping for different product categories. An ANOVA reveals that only females showed significant differences in the use of an assistant agent depending on product categories (F(3, 886)=3.917, p<.01) (figure 2). Females used an assistant agent to a greater degree when shopping for experience goods than when shopping for search goods (Mexperience=1.29, Msearch=.81). The additional analysis demonstrates that females were more willing to use an assistant agent when shopping for experience goods than when shopping for search goods (Mexperience=32%, Msearch=19%, χ²=8.975, p<.004). Again, males did not show any significant differences in the use of an assistant agent across two product categories (Mexperience=21%, Msearch=17%, χ²=6.72, p>.439).

**DISCUSSION**

The purpose of this research is to understand how gender and product categories influence the consumer information search behavior in the online context. Our results show that, compared to males, females tend to search for various information including both product and customer reviews and to use an assistant agent more frequently in the online shopping process. Consistent with the selectivity model (Meyers-Levy 1989; Meyers-Levy et al. 1991; Meyers-Levy et al. 1991), the results imply that females are more likely to be comprehensive processors than males in the online...
environment. According to previous studies on perceived risks in the online context, we suggest the interaction effect of gender and product categories on the consumer information search behavior with the online retailers where the physical contact with products or services is limited. Specifically, females consulted customer reviews and used an assistant agent more often when shopping for experience goods than when shopping for search goods. On the other hands, males showed no significant differences in information search across product categories. This implies that the influence of product characteristics on consumers’ information search differs between males and females.

The findings of the present study have significant theoretical implications. Foremost, unlike most behavioral studies that examined perception or attitudes of consumers, this article observed actual behaviors by analyzing data derived from a popular online retailer. Therefore, by keeping track of the actual consumer behaviors in the shopping process, the present research would contribute to making more accurate predictions on the consumer behaviors in the online context. The present research also expands theorists’ current understanding of online consumers in terms of both personal factors and product characteristics.

Our findings from the real world data could help practitioners apply the results directly to their online retailers. Considering the evidence that females perceive greater risks toward online shopping, managers should try to decrease the perceived risks felt by females by providing various information sources, such as customer reviews. Our research also suggests that degrees of consumers’ desire for interactive experiences differ depending on gender and product categories in the online context. We recommend online retailers to furnish various interactive website features, such as real-time interaction with salespersons, to make the online shopping experience more comparable to the traditional shopping experience especially for females who are shopping for experience goods.

**LIMITATIONS AND FUTURE RESEARCH**

Despite several contributions, this research should have some limitations. First of all, the data included in this research is collected from one single online shopping retailer. Therefore, further data collection from globally dominant online retailers will help to generalize the results.

Second, the present research involves only two types of product categories, clothing and electronic appliances. However,
researchers have categorized products or services in various ways. For instance, Copeland (1923) classified goods according to the degree of effort consumers are likely to expend and the degree of preference formation at the beginning of the shopping process: convenience, shopping, and specialty goods. Therefore, future research can examine the influence of product characteristics on consumer information search behaviors based on different classifications of product types.

Previous studies have suggested that computer experience (Slyke et al. 2002), the amount of computer training (Liao and Cheung 2001), and the knowledge of online shopping are positively related to consumers’ adoption of online shopping. Since consumers’ knowledge and experience of shopping increase as their use of the Internet grows, consumer information search behavior will also change accordingly. Therefore, further research is needed to observe how consumer online shopping behavior, especially information search behavior, evolves over time with more experience.

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