Herding in Online Product Choice

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ABSTRACT

Previous research has shown that people are influenced by others when making decisions. This work presents three studies examining herding in product choices on the Internet. The first two studies addressed how two cues frequently found on the Internet, that is, sales volume and customer reviews, influence consumer on-line product choices. The third study examined the relative effectiveness of two recommendation sources. The experimental results revealed that subjects used the choices and evaluations of others as cues for making their own choices. However, herding effects are offset significantly by negative comments from others. Additionally, the recommendations of other consumers influence the choices of subjects more effectively than recommendations from an expert. Finally, implications of this work are discussed. © 2006 Wiley Periodicals, Inc.

The emerging on-line economy provides consumers with easy access to numerous choices. Unlike traditional face-to-face retail environments, in which products can be seen and touched and customers can consult salespersons, transactions occur in a computer-mediated environment that provides no opportunities for experiencing a product or for face-to-face consultation before making a purchase. Facing numerous options, consumers may delay their purchases or make their choices by a simple

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click. Influencing consumer decisions in such an environment is an important challenge facing marketers.

This study examines how to influence consumer choices on the Internet. Because human judgments are frequently based on a limited number of simplifying heuristics, providing consumers with information on crowd opinions or behavior may be effective for influencing their decisions. Group mimicking behavior has been demonstrated by numerous experiments conducted by sociologists and psychologists (Allen, 1965; Asch, 1956; Bearden & Etzel, 1982). With the emergence of the Internet, it is important to understand the potential of on-line herding behavior in exerting an influence on consumer product choices and to exploit the numerous opportunities it creates as consumers tend to delay purchases not only because of the complexity of the choices but also due to uncertainty regarding the set of options (Greenleaf & Lehmann, 1995). Some previous studies have examined herding on the Internet, such as in digital auctions (Dholakia, Basuroy, & Soltysinski, 2002) and in software downloading (Hanson & Putler, 1996). However, herding in on-line product choices has received little attention so far in the academic literature. Therefore the main objective of this work is to investigate herding in consumer on-line choices.

The remainder of this article is organized as follows. First, knowledge of herding behavior is summarized, followed by research hypotheses, and then the results of the three studies examining the herding effects are presented. This article concludes by discussing the practical implications of this work, along with some possible future research directions.

RESEARCH OVERVIEW

It is part of human nature to imitate. Previous research has shown that people imitate others out of a desire not only to be accepted but also to be safe. People may believe that other consumers have better information on products than they themselves do, and may therefore want to acquire the products for themselves (Bonabeau, 2004). Deutsch and Gerard (1955) identified two types of social influence–normative and informational. Normative influence describes occurrences in which individuals conform to the expectations of others, whereas informational influence is considered to be the tendency to accept information received from others as an indicator of reality. Individuals may either seek information from knowledgeable others or make references based on observing the behavior of other people or groups (Park & Lessig, 1977).

On the Internet, informational rather than normative influence is expected to play a central role in influencing consumers, because individuals do not need to conform to the expectations of others when making a purchase, and they all have informational motives to make good decisions (Dholakia, Basuroy, & Soltysinski, 2002). This study focuses on

informational influence, which in non-Internet settings has been found to influence the consumer decision-making processes related to product evaluations (Pincus & Waters, 1977) and brand selections (Bearden & Etzel, 1982; Park & Lessig, 1977).

Informational Cascade

Imitation behavior, once it occurs in a large number, can form informational cascades (Banerjee, 1992; Bikhchandani, Hirschleifer, & Welch, 1992). Informational cascades occur when individuals follow the previous behavior of others and disregard their own information. Such imitative behavior can be derived from rational inferences based on the decision information of others that dominates individual signals (Anderson & Holt, 1997).

Informational cascades can be found in digital auctions, in which numerous buyers tend to bid for listings that others have already bid for, and ignore similar or more attractive unbid-for listings available within the same category (Dholakia & Soltysinski, 2001). Informational cascades frequently occur in uncertain situations when people describe their preferences sequentially, and where the value of the outcome for any individual is relatively difficult to determine (Bikhchandani et al., 1992). These attributes—occurring in sequence and facing an uncertain environment—may also be applied to on-line purchasing. Although the cue for participating in a particular bid is the number of individuals already participating in the bidding, sales volume may be the cue for purchasing specific products, such as books. The sales volume of best-selling books tends to increase further as individuals purchase them in response to their established sales record, resulting in an informational cascade.

Influence of On-Line Customer Reviews

The Internet provides various ways to obtain product-related information from consumers (Hennig-Thurau & Walsh, 2003). In on-line environments, consumers share their experiences, opinions, and knowledge with others via message boards, Internet forums, and chat rooms. The Internet also provides consumers with an easy medium for communicating and interacting with consumers and the Web site owners. Messages on these electronic exchanges exert a more powerful influence on consumer attitudes than marketer-generated information (Chiou & Cheng, 2003). Bickart and Schindler (2001) indicated that discussion forum messages have greater credibility in inducing empathy than advertising.

Previous studies have also found that consensus could influence interpersonal communication more than nonconsensus information (Burnkrant & Cousinesu, 1975; Kelley, 1967; Pincus & Waters, 1977). The

strength of this consensus is boosted by increasing supportive viewpoints from others (Weiner, 2000). People tend to believe what most others believe, even though these beliefs may not be true (Deutsch & Gerard, 1955). Therefore, herding behavior occurs on the Internet, in which consumers monitor the comments of others regarding specific topics and use them as a basis for their own choices.

However, customer reviews on on-line discussion forums are not all positive (Richins & Marsha, 1983). Reichheld and Sasser (1990) indicated that positive information can increase revenue by attracting new customers. Meanwhile, negative information reduces the credibility of corporate advertising (Solomon, 1998). Negative information is considered a form of customer complaining behavior. Much of the literature has suggested that Web-site owners should be extremely careful about the ways consumers exert a negative impact on their businesses via discussion forums (Chiou & Cheng, 2003). Moreover, negative information is more diagnostic than positive information, because the influence of negative information assigning the target to a lower-quality class exceeds that of positive information's assigning the target to a higher-quality class (Ahluwalia & Gurhan-Canli, 2000; Herr, Kardes, & Kim, 1991). Similarly, previous research on the impression-formation literature also showed that when comparing negative with positive information, people placed greater weight on negative information during product assessment (Fiske, 1980; Skowronski & Carlston, 1989). This work examines the influence of the number of positive comments vis-à-vis the number of negative comments on consumer product choices.

Information Sources of On-Line Product Recommendations

In the Internet retailing context, consumers perceived risk arising from the uncertainty that product quality may not meet their expectations (Grewal, Munger, Iyer, & Levy, 2003). In order to reduce the uncertainty and risk, consumers tend to search for information on the Internet (Peterson & Merino, 2003). Consumers read the comments of others when deciding which book to buy, and rely on agents, such as recommender systems, for finding a new home. In on-line environments, consumers cannot ask a trusted friend or a store clerk for their opinion of a book (West et al., 1999). Collaborative filtering techniques, namely, software that synthesizes the purchases of comparable customers and makes recommendations to current visitors (Bonabeau, 2004), provide a direct response to the needs of consumers for assistance. Therefore, recommender systems substitute numerous like-minded consumers for small numbers of personal reviews or the opinions of experts. Through speed and customization, the Internet enables the opinion pool to exert a direct and rapid impact and can easily generate herding behavior.

Various on-line recommendations may influence consumer choices in different ways because consumers may consider them to have vary-

ing degrees of credibility. According to Kelman (1961) and McGuire (1969), an informational influence operates through the process of internalization. Internalization may occur if reference groups are considered credible. Consistent with this view, Bearden and Etzel (1982) indicated that information from high-credibility referents is likely to be accepted. Kelman (1961) suggests that credibility comprises expertise and trustworthiness. Expertise can be viewed as "authoritativeness" (McCroskey, 1966), "competence" (Whitehead, 1968) and "expertness" (Applbaum & Karl, 1972). Crisci and Kassinove (1973) indicated that perceived level of expertise and strength of advice positively influence subject compliance with source recommendations. Prior research has shown that source expertise and trustworthiness positively influence consumer attitudes toward a brand, as well as their intentions, and purchase behaviors (Harmon & Coney, 1982; Lascu, Bearden, & Rose, 1995). This investigation examines the relative effectiveness of an expert opinion versus crowd opinions in influencing consumer product choices.

HYPOTHESES

According to the preceding review of the literature, this work postulates that providing cues for eliciting herding behaviors will influence consumers and lead to Internet herding behavior. The cues examined in this work for eliciting herding behavior include (a) sales volume, (b) customer reviews, and (c) consumer recommendations. Consumer recommendations are compared with expert recommendations in terms of trustworthiness and expertise.

This investigation first posits that people are sensitive to Internet sales volumes. Best-seller lists, drawn up based on total product sales volume, have also guided consumers and driven imitation from readers (Bonabeau, 2004). Hanson and Putler (1996) demonstrated that consumers selected software programs with higher download counts. The download counts were used to indicate both quality and suitability and assist consumers in making good decisions. When product sales volume is displayed on Web pages, consumers will choose the products with the highest sales volume.

H1: Displaying that a product has high sales volume will positively affect consumer on-line choices regarding that product.

According to previous literature, messages on an Internet discussion forum have greater credibility to evoke stronger empathy and influence consumers more than marketer-generated information (Bickart & Schindler, 2001; Chiou & Cheng, 2003). People tend to believe what the majority of others believe, even though it may not be true.

H2: A high number of positive customer reviews vis-à-vis the number of negative customer reviews will positively influence consumer on-line choices.

Besides the above two hypotheses, which relate to cues of eliciting herding behaviors in consumer on-line choices, this work formulates a set of three hypotheses related to the effectiveness of different on-line recommendation sources in on-line product choices. First, this work posits that "the recommendations of other consumers" will influence consumer on-line choices more than expert recommendations do. In an interesting study on the adoption of new crop strains by farmers during the Indian Green Revolution, wheat farmers responded strongly to the experiences of their neighbors and made decisions based on their performance, rather than professional expert counsel, because they believe that imitating others could reduce the risk of failure (Munshi, 2004). Similarly, consumer on-line recommendations guiding consumers to buy or do something can be considered as opinion aggregators. Another example on the Internet, the Zagat, is a compilation of their readers' opinions, and provides guides to dining, movies, music, and other categories. Such guides are popular because people like to know the preferences of others like themselves (Bonabeau, 2004). Those readers may not be acquainted with each other; however, they are homogeneous and have the same intention to give, as well as receive, the best information possible. That is, consumers are influenced more by collective intelligence than by a small group of experts. Because people are curious about the likes of others, the on-line recommendations of other consumers have become a trusted and popular information source. Second, research on the discounting principle of attribution theory (Kelley, 1967) showed that "other consumers" were considered a more trustworthy source of recommendations than were experts (Senecal & Nantel, 2004). On the other hand, expertise can be viewed as "authoritativeness," "competence," and "expertness" (Applbaum & Karl, 1972; McCroskey, 1966; Whitehead, 1968). Previous research has demonstrated that perceived level of expertise positively impacts subject compliance with source recommendations (Crisci & Kassinove, 1973). Therefore, an expert should be perceived as possessing more expertise than other consumers.

H3: The on-line recommendations of consumers influence consumer choices more effectively than those of an expert.

H4(a): Consumer recommendations are perceived as more trustworthy than expert recommendations on the Internet.

H4(b): Consumer recommendations are perceived as less expert than expert recommendations on the Internet.

STUDY 1

The experiment schema, as illustrated in Table 1, has three levels of relative sales volumes. Subjects were presented with a choice of two books, each with different sales volumes. The relative sales volumes reflected possible real book sales in Taiwan and served as cues for eliciting herding behaviors in this study.

The experiment involved 180 students, including both males and females, from a university in northern Taiwan. Subjects voluntarily signed up to participate to receive extra credit in information management courses. Separate sign-up sheets were employed at each class, and they were the basis for the random assignment of subjects to treatment conditions. Each subject was randomly assigned to one of the three treatment conditions, resulting in 60 subjects attending each treatment condition.

Each participant was led into the experimentation computer room to answer questions on a computer. The subject was asked to choose one of two travel books with similar sounding titles (Happy Travel and Easy Travel) from the on-line bookstore, with the underlying assumption that they planned to travel during the coming holiday. The Web pages of the on-line bookstore presented related information regarding these two travel books. To avoid being affected by other factors, related features of these two travel books were kept identical, including hardcover, pages, publisher, list price, and availability. The background of the on-line bookstore and the books' information on the home page were modified from actual on-line bookstore Web pages. After reading the experimental Web pages, participants were asked to express their overall preferences regarding the two travel books.

The overall preference choices regarding the two books constituted the dependent variable. Differences among conditions were assessed with the use of the analysis of variance. The overall preference choices of two travel books were operationalized by asking, "After you read the information regarding these two travel books in the on-line bookstore, what is your preference for buying each book? Evaluate the two travel books on the following scale." Responses were made with the use of a 6-point scale, indicating their likelihood of buying either one of the two books.

RESULTS AND DISCUSSION

Table 1 presents ANOVA results, which indicates significant differences ($F_{(2,177)} = 14.09, p < .001$) among three groups. Group 1 (mean = 2.20) appeared more likely to buy Book 1 than any other groups (group 2 = 2.85, group 3 = 3.83). Moreover, the result of the LSD test indicated that statistically significant differences existed among groups. Thus, H1 was

Table 1. Design and Choice of Book Results for Study 1.

	Group 1 (n = 60)		Group 2 (n = 60)		Group 3 (n = 60)	
	Book1 Happy Travel	Book2 Easy Travel	Book1 Happy Travel	Book2 Easy Travel	Book1 Happy Travel	Book2 Easy Travel
	8,000 books	2,000 books	6,500 books	3,500 books	5,000 books	5,000 books
Mean[a]	2.20		2.85		3.83	
Standard Deviation	1.13		1.90		1.93	

$F_{(2,177)} = 14.09$ ($p < .001$).
LSD Test[b]: Group1 < Group2*, Group1 < Group3**, Group2 < Group3***

[a] Mean value on a 6-point scale, where 1 indicated "will buy Happy Travel (Book1) and will not buy Easy Travel (Book2)" and 6 indicated "will buy Easy Travel (Book2) and will not buy Happy Travel (Book1)."
[b] * $p < .05$; ** $p < .01$; *** $p < .001$.

supported, suggesting that product sales volume positively influences consumer on-line choices regarding that product.

This study confirms the popular view that actual sales of a book are increased as consumers learn that the book is already selling strongly. To the authors' knowledge, no previously published empirical research has confirmed this view.

Study 2

Participants in this study were presented with exactly the same scenarios as used in Study 1, but this time the independent variable was replaced by three different proportions of positive and negative customer reviews. Participants were exposed to six customer reviews in total. The numbers of positive vis-à-vis negative comments provide cues for eliciting herding behaviors in this study. Table 2 lists the experimental conditions. This investigation was completed by 180 students, including males and females, from a university in northern Taiwan.

The six customer reviews were manipulated by varying the number of favorable versus unfavorable opinions. To increase the authenticity of the customer reviews, the comments were taken from several online bookstore discussion forums. The selected comments were then modified to make them suitable for the two subject books. A total of 60 modified comments, including both negative and positive comments, were used for a pilot study. The pilot study was performed to classify the comments correctly into positive or negative comments. It was necessary to ensure that the comments of different favorableness levels differed significantly but did not differ significantly on favorableness within each level. Additionally, it was essential to maintain the comprehensibility of the comments at the same level across the comments.

Table 2. Design and Choice of Book Results for Study 2.

	Group 1 (n = 60)		Group 2 (n = 60)		Group 3 (n = 60)	
	Book1 Happy Travel	Book2 Easy Travel	Book1 Happy Travel	Book2 Easy Travel	Book1 Happy Travel	Book2 Easy Travel
	5 positive 1 negative	1 positive 5 negative	4 positive 2 negative	2 positive 4 negative	3 positive 3 negative	3 positive 3 negative
Mean	2.70		3.48		3.53	
Standard Deviation	1.58		1.98		1.72	

$F_{(2,177)} = 3.80$ ($p = .024$).
LSD Test[b]: Group1 < Group2*, Group1 < Group3**

[a] Mean value on a 6-point scale, where 1 indicated "will buy Happy Travel (Book1) and will not buy Easy Travel (Book2)" and 6 indicated "will buy Easy Travel (Book2) and will not buy Happy Travel (Book1)."
[b] * $p < .05$; ** $p < .01$.

It was also important for positive and negative comments to display no differences in persuasiveness. Sixty students were asked to rate the favorableness, comprehension, and persuasiveness of the 60 comments. Based on the above criteria, 36 comments (18 positive and 18 negative) were selected for formal study. An example in the positive message pool was, "Travel Happiness is really an excellent travel guiding book; the introduction is clear and in detail, and the pictures are so beautiful and vivid. Travel Happiness is a good choice!" An example in the negative message pool was, "It is not easy to understand the content of Travel Happiness. It seems to me the traveling record is so boring. It is hard to read. I am so disappointed to read this book." The 18 positive comments were identical to each other in terms of length and meaning; only the wording was changed. Likewise, the 18 negative comments were identical to each other in terms of length and meaning, only the wording was changed.

The 36 comments were randomly assigned to the three groups. The comments include five positive comments and one negative comment versus one positive and five negative comments for Group 1, four positive and two negative comments versus two positive and four negative comments for Group 2, and three positive and three negative comments versus three positive and three negative comments for Group 3. The relative numbers of positive and negative comments reflected possible real situations on a customer comment board and were used to test herding effects in this study.

RESULTS AND DISCUSSION

Table 2 illustrates the results of the one-way ANOVA analysis. Statistical differences were identified among the three groups ($F_{(2,177)} = 3.80$, $p =$

.024). Group 1 appeared to have the lowest mean score for consumer on-line choices (group 1 = 2.70, group 2 = 3.38, and group 3 = 3.53). Additionally, significant differences were found between groups 1 and 2, and groups 1 and 3. However, the difference between groups 2 and 3 was not statistically significant. The mean scores increased monotonically from low to medium to high. Therefore, it can be concluded that H2, which postulates that the relative number of positive customer comments vis-à-vis negative customer comments influences consumer choices, was supported at the significance level of .05.

Study 2 indicates that subjects are sensitive to the relative number of on-line positive vis-à-vis negative customer reviews. When subjects encountered several positive and negative comments, they tended to use the relative number as a basis for inferring whether a product was good or bad, resulting in herding behavior. Groups 2 and 3 displayed no statistically significant difference. Apparently, the relative numbers of positive and negative comments do not crucially influence consumer choices unless the threshold of consciousness for consumers is reached.

The mean scores of consumer choices in Groups 1 and 2 in Study 2 exceed those in Study 1, indicating that the herding effects of Groups 1 and 2 in Study 2 are smaller than those in Study 1. One possible explanation for this is that negative information is more diagnostic than positive information, because negative information is more easily adopted to allocate the target to a lower-quality category than positive information is adopted to allocate the target to a higher-quality category (Ahluwalia & Gurhan-Canli, 2000). The experimental treatments in Study 2 for Groups 1 and 2 incorporated negative comments. The results showed that the herding effects were offset significantly by negative comments. Consistent with this view, the impression-formation literature also demonstrated that people placed more weight on negative rather than positive information when evaluating a product (Fiske, 1980; Skowronski & Carlston, 1989). Additionally, the results showed that the offset to herding effects by negative comments would decrease gradually. When the scenario represented a great herding effect, such as in Group 1, people placed heavy weight on a negative comment. Additional negative comments would bring smaller offset influence on herding effect, as the results in Groups 2 and 3 show. That is, only when the quantity of positive comments was sufficiently large to cover the negative feelings regarding that product would those comments truly influence the purchasing intentions of consumers.

STUDY 3

Study 3 examined whether crowds or an expert exerted more influence on the on-line choices of consumers. A between-subjects design with three treatments was used to examine H3, H4(a), and H4(b). One hundred ninety-five students from a university in northern Taiwan participated

in the on-line experiment in exchange for around $8 US in cash. Each subject was randomly assigned to one of three following conditions: consumer recommendation, expert recommendation, and no recommendation. After having read Web pages, subjects were asked to evaluate their purchase intentions for one travel book in the on-line bookstore and then complete an on-line questionnaire regarding the credibility of the recommendation sources.

The Web pages of the on-line bookstore presented related information regarding the travel book. Additionally, the recommendation page presented recommendations and their source (consumers or an expert). For the consumer recommendation treatment (Group 1), the recommendation for the travel book was presented as follows: "This recommendation is based on other consumer selections. Happy Travel is the leading book in the tourism area as voted for on-line by readers." For subjects assigned to the expert recommendation treatment (Group 2), the recommendation was presented as follows: "This recommendation is based on evaluation by a tourism expert. Our advisors, experts in the tourism area, strongly recommend Happy Travel." Subjects assigned to the no recommendation treatment (Group 3) were not exposed to any recommendation. Besides this, identical information was provided for each treatment. After reading the experimental Web pages, participants were asked to express their purchase intentions regarding the travel book.

Travel-book purchase intention was operationalized by asking, "After you read the information regarding this travel book in the on-line bookstore, what is your intention to buy this book?" Subsequently, subjects who had viewed the recommendation page (containing recommendations either by consumers or an expert) were asked to complete a scale for measuring recommendation credibility designed by Ohanian (1990) for assessing the expertise and trustworthiness of the recommendation sources. The experimental results show the reliability of the measurement scale. The Cronbach's alphas for the expertise and trustworthiness dimensions are 0.80 and 0.85, respectively.

RESULTS AND DISCUSSION

To test H3, one-way ANOVA analysis was performed to determine the existence of significant differences regarding consumer choices in the on-line bookstore among the three different recommendation conditions. Additionally, because both H4(a) and H4(b) dealt with categorical independent variables (type of recommendation source) and dependent variables that were continuous (perceived trust and expertise), a MANOVA analysis was performed to assess the perceptions of trustworthiness and expertise on different recommendation sources.

Table 3 lists the ANOVA results, which indicates significant differences ($F_{(2,192)} = 8.54, p < .001$) among the three different recommenda-

tion conditions. Consumer recommendation (mean = 4.32) appeared to influence respondents' purchase intentions more strongly than either expert recommendation (mean = 3.92) and no recommendation (mean = 3.54). The LSD test demonstrated statistically significant differences among the three different recommendation sources. Thus, on-line product recommendations strongly influenced consumer product choices. Moreover, on-line consumer recommendations were more influential than those of an on-line expert. H3 thus was supported.

MANOVA analysis reveals that statistically significant differences existed in trustworthiness and expertise among different recommendation sources (Wilks's lambda: $F_{(2,127)} = 24.33$, $p < .001$). Table 3 shows that both trustworthiness and expertise were significant, but their signs differed. In terms of trustworthiness, as predicted by H4(a), consumer recommendations were considered significantly more trustworthy than expert recommendations (mean = 4.11 and 3.55, respectively; $F_{(1,128)} = 17.67, p < .001$). As predicted by H4(b), consumer recommendations were perceived as being based on less expertise than expert recommendations (mean = 3.86 and 4.29, respectively; $F_{(1,128)} = 14.09, p < .001$).

This study finds that consumer on-line recommendations influence consumer choices more than those of an expert. Respondents rely more on recommendations from others like themselves than the counsel of

Table 3. Choice of Book, Perception of Trustworthiness and Perception of Expertise for Study 3.

		Group 1 (n = 65)	Group 2 (n = 65)	Group 3 (n = 65)
		Consumer Recommendation	Expert Recommendation	No Recommendation
Choice	Mean[a]	4.32	3.92	3.54
	Standard Deviation	1.03	1.05	1.16
	$F_{(2,192)} = 8.54$ ($p < .001$)			
	LSD Test: Group1 > Group2*, Group1 > Group3***, Group2 > Group3*			
Trustworthiness	Mean[a]	4.11	3.58	
	Standard Deviation	.65	.78	
	$F_{(1,128)} = 17.67$ ($p < .001$)			
Expertise	Mean[a]	3.86	4.29	
	Standard Deviation	.53	.78	
	$F_{(1,128)} = 14.09$ ($p < .001$)			

[a] Mean value on a 6-point scale, where 1 indicated "strongly disagree" and 6 indicated "strongly agree."
[b] * $p < .05$; ** $p < .01$; *** $p < .001$.

professional critics when making choices. The question of why people herd then arises. Possibly, herding occurs because crowds are right more often than experts are. Interestingly, the TV studio audience of Who Wants to Be a Millionaire guesses correctly 91% of the time, compared to experts, who only manage a 65% correct rate. In another case in the early 1920s, Knight asked the students in her class to estimate the temperature of the room. The group guessed 72.4 degrees, whereas the actual temperature was 72 degrees (Surowiecki, 2004). Large groups of people usually perform better than small groups of elites in solving problems and even predicting the future (Kambil & van Heck, 2002). Experts, regardless of their knowledge, only possess limited amounts of information. Moreover, just like anyone else, experts also have biases. Another problem is the difficulty of identifying true experts. For many people, herding offers a better heuristic than following expert opinion.

GENERAL DISCUSSION AND IMPLICATIONS

This investigation examined cues that elicit herd behavior and influence consumer on-line choices. The analytical results showed that sales volume and the number of positive vis-à-vis negative customer comments of a product influenced the on-line product choices of subjects. Additionally, the recommendations of other consumers influenced subject choices more effectively than expert recommendations did.

The results of this research have various implications for marketers. First, on-line marketers may use cues, such as sales volumes and customer reviews, to induce purchase intentions. However, on-line marketers should pay attention to negative customer reviews, because negative information is more diagnostic than positive information (Ahluwalia & Gurhan-Canli, 2000) and the herding effects are offset significantly by negative comments. Only when the quantity of positive comments is sufficiently large to overcome the negative attitudes from negative comments will those positive comments improve consumer purchasing intentions.

On-line marketers should exploit the power of crowds. For instance, on-line marketers can encourage positive word of mouth to help create a positive impression among potential consumers. Companies can initiate programs in which consumers who recommend products to others are rewarded. A less-expensive approach could be providing a "tell other consumers about this product" link to help on-line shoppers share their experiences with others. Furthermore, companies can establish a recommender system, recommending products on the basis of the preferences of their other customers. Such recommendations reduce the search costs for consumers, promote on-line sales, and have the benefits of target promotion. Finally, on-line marketers should remember that product recommendations by experts or by themselves are less effective than those by other consumers.

Because limited studies exist on on-line herding behavior, numerous possible research avenues exist. First, the present study only examined one kind of product, that is, books. Future studies could consider other products to better understand on-line herding behavior. Second, this study was conducted in Taiwan with Taiwanese subjects. The results thus may or may not be applicable to consumers in other cultures. It would be interesting to find out whether culture influences consumer on-line herding behavior. Third, perceived risks might increase susceptibility to imitation. It would be interesting to investigate how the interactions between consumer perceived risks and herding behavior affect consumer on-line choices. Fourth, possible areas for further research include assessing consumer satisfaction (Szymanski & Hise, 2000) and loyalty (Srinivasan, Anderson, & Ponnavolu, 2002) either when consumers are following the product choices of others, or when they are making their own choices. Finally, future research could examine possible mediators (e.g., price) that might elicit on-line herding behavior. Exploring these mediators is likely to provide a fruitful extension to this work.

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