The Effect of On-Line Consumer Reviews on Consumer Purchasing Intention: The Moderating Role of Involvement

Do-Hyung Park, Jumin Lee, and Ingoo Han

ABSTRACT: On-line consumer reviews, functioning both as informants and as recommenders, are important in making purchase decisions and for product sales. Their persuasive impact depends on both their quality and their quantity. This paper uses the elaboration likelihood model to explain how level of involvement with a product moderates these relationships. The study produces three major findings: (1) the quality of on-line reviews has a positive effect on consumers' purchasing intention, (2) purchasing intention increases as the number of reviews increases, and (3) low-involvement consumers are affected by the quantity rather than the quality of reviews, but high-involvement consumers are affected by review quantity mainly when the review quality is high. These findings have implications for on-line sellers in terms of how to manage on-line consumer reviews.

KEY WORDS AND PHRASES: Consumer involvement, elaboration likelihood model, electronic word-of-mouth, on-line consumer review, on-line word of mouth, product review.

Internet-based electronic commerce is growing rapidly with the proliferation of commercial Web sites and the increasing acceptance of on-line transactions by consumers [23]. As a new marketing channel, the World Wide Web differs from traditional retail formats in many ways [1]. Consumers shopping on-line cannot touch or smell products, as would be possible in traditional retail outlets, so their purchase judgments must be based on the product information presented on the Web site. On-line sellers seek to overcome this limitation by giving consumers the opportunity to share product evaluations on-line [11, 12]. This consumer-created information is helpful in making purchase decisions because it provides indirect experiences of products.

In contrast to a traditional seller, an on-line seller generally provides consumers with two types of product information. It can offer seller-created product information via its Web site or other traditional communication channels such as advertisements, and it can also offer consumer-created product information by allowing consumers to post comments on its Web site. Consumer-created information, an on-line consumer review, is new information presented from the perspective of consumers who have purchased and used the product. It includes their experiences, evaluations, and opinions. The user-oriented information provided in this way is, in effect, a new kind of word-of-mouth communication. As an independent product-information resource, on-line reviews are increasing in popularity and importance [12, 22].

The first author thanks Yoonhee Hwang for help with the idea generation of this study. The comments and guidance of Sebum Park is gratefully acknowledged. The authors also thank the editor and reviewers for valuable comments.
An on-line consumer review is an important factor in product sales [13]. For example, Amazon.com began to offer consumers the option of posting product comments on its Web site in 1995. At present, Amazon.com has about 10 million consumer reviews covering all of its product categories. These reviews are one of its most popular and successful features [21]. Other on-line sellers in many product categories are adopting the same strategy of providing a venue where consumers can voice their opinions. Half the consumers who visit on-line shopping malls consider consumer reviews important in their buying decisions [37].

The quantity and quality of on-line consumer reviews are important characteristics affecting consumer information-processing. The number of on-line reviews of a product (review quantity) may be taken as representing the product's popularity, since it is reasonable to assume that the number of reviews is related to the number of consumers who have bought the product [11, 12]. Since there is no standard format, the content of on-line reviews (review quality) varies from short to long and from subjective to objective [11]. A high-quality review is one that is more logical and persuasive, and supports its evaluation with reasons based on the facts about a product.

Involvement with the product has a moderating effect on information-processing [34]. The elaboration likelihood model (ELM) suggests that the same information can be processed in different ways depending on consumer involvement. Applying ELM, one would expect review quality to be of primary importance for high-involvement consumers, and review quantity to be crucial for low-involvement consumers. Do on-line consumer reviews, unlike advertisement messages, have the same results as what is predicted with ELM? To date, no study has specifically investigated the effects of review characteristics and the moderating effect of consumer involvement on consumers' purchasing intention.

The present paper investigates whether the quantity and quality of on-line consumer reviews can affect consumers' purchasing intention and how these effects are changed by consumer involvement. In addition, it shows the underlying mechanism through which on-line consumer reviews influence purchasing intention. The study focuses on the effects of positive on-line consumer reviews as a new kind of positive word-of-mouth. Several hypotheses are proposed, and an experiment is conducted that addresses these questions in the context of positive on-line consumer reviews.

**Theoretical Background and Hypotheses**

**Dual Role of On-Line Consumer Reviews**

Two types of product information are available to an on-line consumer in contrast to an off-line consumer. One is seller-created information via a traditional communication channel, such as advertisements, and the other consists of on-line consumer reviews created by prior buyers based on their experiences, evaluations, and opinions of products. An on-line consumer review has a dual role, functioning both as informant and as recommender.
As informant, it provides user-oriented product information, while as recommender, it provides recommendations by previous consumers in the form of electronic word-of-mouth (eWOM).

Although sellers also provide product information, it differs in three important respects from the kind of information provided by consumer reviews. The first difference is the trustworthiness of the information source. The trustworthiness of an information source is often positively related to information credibility [4]. Previous studies suggest that consumer-created information is more credible than seller-created information from the perspective of trustworthiness [16]. When sellers present product information, they tend to hide inferior aspects of a product and emphasize good aspects. Consumers, in contrast, provide honest evaluations of the strengths and weaknesses of a product from the user’s viewpoint. Thus, on-line consumer reviews are likely to be more trustworthy than seller-created information. The second difference is that consumer-created information will tend to be more consumer-oriented than seller-created information [4]. Seller-created information is product-oriented and objective, focusing on product attributes for many and unspecified persons. Consumer-created information describes the usage situations and product advantages from the consumer’s perspective. It is more understandable and familiar because it represents consumers’ personal feelings or satisfaction about the product [12]. Finally, seller-created information is presented in a standard form, whereas consumer-created information is not. It can be subjective information, consisting mainly of emotional expressions, or it can be objective information just like seller-created information. In addition, it can consist of a few words or many words.

An on-line consumer review is a new form of word-of-mouth communication as a recommender. It is similar to traditional word-of-mouth as a messenger of other consumers’ opinions [11, 12]. There are, however, three major differences between on-line consumer reviews and traditional word-of-mouth. First, the influence of traditional word-of-mouth is typically limited to a local social network [7]. In contrast, the impact of on-line consumer reviews can reach far beyond the local community, because consumers anywhere in the world can access reviews on the Internet [12]. Second, traditional word-of-mouth is not a decision variable for a seller, whereas on-line sellers can decide whether to provide on-line consumer reviews on their Web site. An on-line seller can license consumer reviews from intermediaries such as Epinions.com, and decide when to post them on its Web site [12]. In addition, an on-line seller can select “remarkable” reviews and post them in front of its Web site, thereby leading consumers to concentrate on the reviews. Finally, the information sources of traditional word-of-mouth are familiar people, such as family members or friends, whereas on-line consumer reviews come from unknown former purchasers [38]. Because their authors are unknown, on-line reviews may have less credibility than direct messages from a consumer’s family or friends. Thus, the content of an on-line consumer review is an important element in overcoming the lack of message credibility. If an on-line review is persuasive and logical, consumers are more likely to believe the message. In addition, if a great many consumers recommend a product, other consumers, in conformity with their views, are likely to believe the recommendations and have a favorable attitude toward the product.
Effects of Review Quantity and Quality on Purchasing Intention

A significant body of research in the MIS literature represents information quality in terms of credibility, objectiveness, timeliness, and sufficiency [3, 33, 41]. This body of research finds that the better and more extensive the information is, the greater the consumer satisfaction. In addition, as consumer satisfaction increases, so too do consumers' purchasing intention. Therefore, information quality can have a positive effect on purchasing intention.

Much research on the quality of messages in marketing literature focuses on the message contents. These studies show that strong messages, that is to say, messages which are understandable and objective, are more effective than weak ones, which are emotional and subjective [34, 36]. From the perspective of message quantity, the more the messages are processed, the more favorable associations to its advocacy are formed. This leads to a more favorable attitude [34].

There is no standard information format for consumers posting reviews, and as a result, each on-line consumer review is different from others. There are generally two types of reviews. Some reviews, such as "It's so good that I'm going to buy another one" or "I can't believe I got this; I'm proud of it," are subjective, emotional, and do not make reasoned arguments. Other reviews, such as "This product is twice as fast as other comparable goods and even cheaper," are specific, clear, and back up their claims with reasons.

In the present study, review quality is defined as the quality of a review's contents from the perspective of information characteristics (relevance, understandability, sufficiency, and objectivity). Using this definition of review quality, the last review example in the preceding paragraph is a high-quality review because it is more logical and persuasive and gives reasons based on specific facts about the product. In contrast, the earlier review examples are low-quality reviews because they are emotional, subjective, and vacuous, offer no factual information, and simply make a recommendation. Consumers may treat reviews as a source of supplementary information of WOM. Since reviews are posted by people who have purchased the product in question, even subjective and emotional reviews (defined as low-quality reviews in this study) provide important and useful information when they are positive. If a review contains more understandable and objective comments with sufficient reasons of recommendation, it is relatively more persuasive than a comment that expresses feelings and recommendations without specific reasons. Since previous buyers are anonymous on the Internet, people generally will not easily accept or believe a review posted on a Web site if it does not provide enough information [38]. Other things being equal, reviews that are more persuasive have a greater positive effect on consumers' purchasing intention. Thus the following hypothesis is proposed:

H1: The quality of on-line consumer reviews positively affects consumers' purchasing intention.

The number of on-line consumer reviews (review quantity) of a product represents the product's popularity as the on-line word-of-mouth effect be-
cause it is related to the sales volume of the product [11, 12]. The more reviews there are, the more popular and important the product is. In addition, the number of reviews is likely to lead consumers to rationalize their purchasing decisions by telling themselves, “Many other people also bought the product.” Reference to word-of-mouth (other people’s comments) is a risk-reduction strategy that can do much to reduce or eliminate the uncomfortable feeling of risk exposure [8]. As a result, purchasing intention will increase in accordance with the number of on-line consumer reviews.

H2: The quantity of on-line consumer reviews positively affects consumers’ purchasing intention.

**Involvement and the Elaboration Likelihood Model**

Involvement is defined as the perceived personal relevance of a product based on the individual consumer’s needs, interests, and values [20, 27, 42]. Involvement can be either situational or enduring [9]. Situational involvement is a temporary elevation of interest that fluctuates, usually within the time frame of a purchase decision, while enduring product involvement is a stable phenomenon that represents the consumer's personal interest in the product over a long period [9]. The information-processing motivation is influenced by situational involvement and enduring involvement [9]. Zaichkowsky’s research stream relates to the concept of situational involvement or purchase-decision involvement [30, 43]. Others conceptualize involvement as enduring interest in the product class, and thus as enduring involvement or product-class involvement [39]. It is recognized that involvement may vary between a specific decision and a product class. In addition, some products are inherently involving because of the nature of the purchase [43]. However, it is argued that products per se cannot be intrinsically involving. For example, shampoo may be both high involvement and low involvement depending on the circumstances surrounding the purchase decision. A high-involvement shampoo purchase might be characterized by (for example) a first independent shampoo purchase, a consumer who is unfamiliar with the product, a consumer who may previously have had a poor experience with shampoo, one who may have allergies, or one concerned about social issues (such as not tested on animals) that need to be considered [6]. Thus, the characteristics assigned to low-involvement products by researchers on advertising involvement may not hold in all circumstances. Furthermore, some high-involvement products may not be purchased by highly involved consumers [26]. For example, a car buyer may believe that the outcome (a car to drive) is important, but may have no interest in the purchase process. Consequently, no assumptions regarding high or low involvement can be assigned to the product or the product class, as involvement may vary with the various antecedents to involvement as they relate to the individual consumer.

Situational involvement, defined as the ability of a situation to elicit from individuals concern for their behavior in that situation [24], is used as the moderating variable in the present study. There were three reasons for using situational involvement instead of enduring involvement. First, individuals’
involvement for the same product can be different depending on their personal characteristics. Second, it is hard to control the compounding effects resulting from the difference between two products used in a laboratory experiment (e.g., shampoo vs. notebook). The method of giving subjects different goals for a single product can increase the internal validity of this study. Third, as Mittal suggests, the situational importance of a purchasing decision is likely to be most representative of the variance in the consumer’s involvement, even more than product-class involvement [32].

Involvement with a product equips a consumer with the ability and motivation to initiate product-related conversations with others. According to Dichter, intense occupation with a product creates excess thoughts and emotions that can be easily recalled in word-of-mouth episodes in order to relieve the tension or relive the experience [17]. Reviewing earlier empirical evidence, Arndt confirmed the association between involvement and word-of-mouth transmission [2]. Other researchers also corroborated the association [5]. Thus, on-line consumer reviews as on-line word-of-mouth are associated with consumer involvement. This association is more evident when applying ELM.

ELM offers an appealing theoretical perspective on the consumer-information process with regard to on-line consumer reviews [35]. ELM posits that individuals who want to process a message (i.e., who have motivation) and individuals who are able to process the message (i.e., who have the ability) are more likely to process persuasive attempts via the central route [28]. In other words, they are more likely to engage in thoughtful, effortful processing of persuasive arguments, attend to the persuasive arguments, and then generate their own thoughts in relation to the arguments. However, individuals who lack motivation or ability are more likely to process the information via the peripheral routes, which are mental shortcuts, by focusing on noncontent cues.

In ELM, involvement is associated with the motivation to process information, and prior knowledge (expertise) is associated with the ability to process information [9, 34]. In this study, involvement is used as a moderating variable for information processing, and prior knowledge as a control variable. As involvement increases, individuals have greater motivation to comprehend the salient information, and they will tend to produce increasingly elaborate meanings during the comprehension stage of information processing. When involvement is low, however, individuals will rely on peripheral cues from the stimulus, such as the number of arguments. Researchers on ELM have found that issue-relevant arguments and product-relevant attributes were more influential under high-involvement conditions, while peripheral cues, such as the characteristics of information sources or number of arguments, were more influential under low-involvement conditions [10, 34, 36].

Petty and Cacioppo conducted a study in which they induced high and low involvement [34]. They also varied the number of arguments presented in a persuasive message. Participants in the low-involvement condition revealed a positive, linear relationship between attitude change and number of arguments in the message. Thus they were persuaded via the simple decision-making tool “lots of arguments are good.” For those in the high-involvement condition, however, the number of argument messages did not increase attitude change. Argument quality is critical to attitude change. Moreover, meta-ana-
lytic research has consistently found that as involvement increases, so does the importance of argument quality [25].

According to this research, the effects of review quality and review quantity can vary with involvement. Low-involvement consumers simply accept what other consumers recommend because they have low motivation to process other consumers' opinions. The review quality is less important for them. The number of on-line consumer reviews to show product popularity is more important as a peripheral cue. On the other hand, high-involvement consumers seek as much useful information as they can from on-line consumer reviews. They want high-quality reviews that are logical and persuasive, with sufficient reasons based on specific facts about the product. Therefore, the following hypotheses are proposed:

\[ H3: \text{The quality of on-line consumer reviews has a stronger positive effect on the purchasing intention of high-involvement consumers than of low-involvement consumers.} \]

\[ H4: \text{The quantity of on-line consumer reviews has a stronger positive effect on the purchasing intention of low-involvement consumers than of high-involvement consumers.} \]

**Research Design and Method**

**Design, Subjects, and Experimental System**

We employed a $2 \times 2 \times 2$ factorial design. The three independent variables were review quality (high vs. low), review quantity (few vs. moderate), and involvement (high vs. low).

Three hundred fifty-two college students participated voluntarily. Their average age was 23, and 72 percent of them were male. Every subject was given a reward. Subjects were randomly assigned to each of the cells in the factorial design. Most of them (about 98%) already had purchase experience in on-line shopping malls.

The experimental product was a portable multimedia player (PMP), a portable next-generation multimedia player that plays digital music and video files. There were three reasons for choosing a PMP as the experiment product: (1) electronic products are frequently purchased in on-line shopping malls, (2) consumers tend to rely on comments from previous users because electronic products are so complicated, and (3) since the PMP was a brand-new and unfamiliar product, the consumers processing the suggested information had no stereotypes about the brand and its brand category.

A virtual shopping mall site was provided for each subject. The mall contained both seller-created information about the target product and consumer reviews. The seller-created information consisted of an overview of the product and its functions. A picture of the product was provided, but its brand name was hidden to remove any brand effect. All of this information was replicated from real on-line shopping malls.
High-quality review

The picture on the 3.5" LCD monitor is absolutely amazing, I am really impressed with the colors and the contrast between darks on such a small screen. Plays songs at top-quality sound with 5.1 channels. Almost every format is supported.

Low-quality review

Woowoooooo! I searched for days and compared every PMP and finally bought one. I'm really enjoying it and it is tough to put it down. All my friends envy my PMP. Right now I'm writing a review, but I can't wait to play my PMP.

Table 1. Review Examples.

Independent Variables

On-line Consumer Reviews. Forty reviews were created based on real reviews from on-line shopping malls. Each on-line consumer review included a title, the reviewer's name, and the contents. The length of the reviews was controlled because it can affect information quality and quantity [14]. The length of each review was set at three lines with a font size of 10 point type.

A focus group interview (18 subjects) was used to decide the level of review quantity. The members of the focus group did not participate in the main experiment but were asked to define how many reviews were few or moderate. When surfing Internet shopping malls, these members reported, they generally read five or six reviews of three or four lines each. Along these interview results, one was selected as the few level and six was selected as the moderate level for review quantity.

Relevance, objectiveness, understandability, and sufficiency were chosen as the criteria for review quality. High-quality reviews are product-relevant, understandable, and persuasive, with sufficient reasons based on facts about the product. Low-quality reviews are emotional, subjective, and vacuous, with no information except expressions of subjective feelings or simple interjections (e.g., "Wow!", "How wonderful!"). The reviews were classified as either high or low quality. Table 1 shows examples. Before the main experiment, a pretest was conducted to check whether these reviews were perceived as intended. Twenty subjects (who did not participate in the main experiment) were asked to classify each review according to its quality. The reviews that all of them selected as either high or low quality were used for the main experiment.

Involvement. The study employed situational involvement for involvement manipulation by embedding role-playing in the introductory page [29, 31]. Involvement was dichotomized into high and low levels. The two involvement situations differed in the amount of goal directedness. The high-involvement respondents were asked to imagine a scenario where they worked in the multimedia industry and had to buy a PMP product for their business. These instructions created a high level of goal directedness, with respondents focusing their attention on PMP-related issues. In addition, these subjects were told, "You were specially selected for this study. Your answers will be treated as
important. We will have an interview in the second experimental session and offer free gifts after the session." [29] However, the role-playing instructions in the low-involvement situation completely lacked goal directedness. Low-involvement subjects were simply asked to imagine that they were browsing a Web site for fun and were also told that this experiment was going on in every university in Seoul, and their individual answers would be but one part of the overall results [29, 31]. Thanks to this manipulation, the high-involvement subjects read and processed the product information more carefully than the low-involvement subjects.

**Control Variables**

An on-line shopping experiment could be affected by the characteristics of the subjects (e.g., prior on-line shopping experience) and the stimulus (e.g., prices or brand names of products) [23]. Multiple methods were used to control for the effects of possible confounding variables in order to improve the study’s internal validity. Individual differences, including personality, cognitive style, and personal Web experiences, were controlled for these factors by randomly assigning subjects to the experimental conditions.

All groups had to equally accept seller-created information. Four measurements were used to check this. In addition, the perception that each review of the product was positive had to be controlled because the study was only considering positive reviews. This control was measured by two items. The measurements are in the Appendix.

In an experiment of this kind, it is also necessary to control other variables that might change the effects of on-line consumer reviews, such as brand effect, attitude toward the reviews, and prior knowledge of the product. In the present experiment, the product was so brand-new that product familiarity was easily controlled. Brand effect was also no problem, because the brand name and information about the brand were not revealed. The survey asked questions about prior knowledge and general attitude toward reviews (i.e., perceived usefulness and trust in reviews). The prior-knowledge variable was measured by an item with anchors ranging from “I’ve never heard of it” to “I know it well,” and the general attitude toward reviews was measured by six items. The measurements of general attitude toward reviews are in the Appendix.

**Dependent Variable**

*Purchasing Intention.* Purchasing intention was measured on two six-point numeric scales. The scale items were taken from previous studies published in the information technology and marketing literature. These measurements ranged from 1, representing extremely unlikely, to 6, extremely likely. The corresponding questions were “How likely is it that you will buy this product?” and “How likely is it that you will recommend this product to your friends?” [15].
Experimental Procedures

At the start of the experiment, the subjects were told that they were to carefully read the instructions provided in the survey and then complete the experiment independently. The subjects were manipulated to imagine different scenarios in terms of involvement. Product information—seller-created information and on-line consumer reviews—was provided. The quantity and quality of the on-line consumer reviews provided to each group were different, depending on its conditions. Afterward, the subjects were asked to fill in the same questionnaire, focusing first on purchasing intention, then processing measures of the two roles of on-line consumer reviews, manipulation checks, recall checks, and demographic information.

Research Results

Manipulation and Control Checks

The subjects’ responses on the two items designed to check their perceptions of the quantity of reviews were averaged. An ANOVA analysis indicated the presence of the main effect of review quantity \( F(1, 350) = 480.236, p < 0.001 \). Subjects in the six-review condition perceived the quantity of reviews as greater than subjects in the one-review condition (\( M = 3.52 \) and \( 1.85 \)). Thus, the review quantity was manipulated successfully. The subjects’ responses on the manipulation checks relevant to the quality of reviews were also examined. These were averaged for an ANOVA test. The result showed that subjects in the high-quality-review condition had greater perceptions of the quality of the reviews than those in the low-quality-review condition \( F(1, 350) = 85.232, p < 0.001, M = 3.64 \) and \( 2.94 \). The review quality was also manipulated. Finally, the involvement manipulation check was performed. Recall scores were used for this manipulation check [40]. Subjects were asked to check the attributes of the experiment product among eight attributes. Only five of the attributes offered were correct. Subjects in the high-involvement condition had more correct answers than those in the low-involvement condition \( F(1, 350) = 418.689, p < 0.001, M = 7.11 \) and \( 5.05 \). The involvement condition was manipulated successfully.

All groups equally accepted seller-created information. The degree of review positiveness was also controlled successfully. The subjects’ general attitudes toward reviews were checked. The factor analysis revealed that attitude had two factors (eigenvalue = 2.869 and Cronbach’s \( \alpha = 0.79 \); eigenvalue = 1.189 and Cronbach’s \( \alpha = 0.70 \)). The two factors and prior product knowledge were used as covariate variables for testing the hypotheses.

Hypothesis Testing

Consumer purchasing intention had a single-factor structure when the two items were factor analyzed. The single factor was generated with an eigenvalue
Table 2. Descriptive Statistics of Purchasing Intention.

The hypotheses were tested by performing an ANCOVA. The results are in Table 3. The covariate variables were not significant. The analysis indicated the presence of a significant main effect of the review quantity \( F(1, 337) = 112.680, p < 0.001 \). The main effect of the review quality was also significant \( F(1, 337) = 30.556, p < 0.001 \). Thus, Hypotheses 1 and 2 were accepted. The review quantity \( \times \) review quality interaction effect was significant \( F(1, 337) = 16.706, p < 0.001 \). This result showed that consumer purchasing intention increased more as the number of high-quality reviews increased than as the number of low-quality reviews increased.

The review quality \( \times \) involvement interaction \( F(1, 337) = 9.483, p < 0.002 \) revealed that review quality has a stronger impact on purchasing intention under high-involvement conditions than under low-involvement conditions. The effect of review quality was significant in the high-involvement condition but not in the low-involvement condition (see Figure 1). This result was the same as the prediction from ELM. Thus, Hypothesis 3 was accepted. However, the review quantity \( \times \) involvement interaction effect was not significant \( F(1, 337) = 2.452, p < 0.118 \). That is, the effects of review quantity were significant for both high- and low-involvement subjects, and the impacts of the review quantity on purchasing intention did not differ depending on the level of involvement (Planned contrast: \( F(1, 348) = 2.116, p < 0.147 \)). Thus, Hypothesis 4 was rejected. This result differed from the ELM prediction, showing that high-involvement subjects considered review quantity important information for their purchasing.

The results were further explained by exploring the different effects of review quantity and review quality under low- and high-involvement conditions. It was possible to perform these analyses because the three-way interaction effect of review quantity \( \times \) review quality \( \times \) involvement was significant \( F(1, 337) = 8.277, p < 0.004 \). For low-involvement subjects, only the main effect of the review quantity was significant \( F(1, 165) = 30.483, p < 0.001 \). The graph on the left in Figure 2 shows the results. The expected results of ELM in the low-involvement condition were replicated in the context of on-line consumer reviews. In the low-involvement conditions, subjects revealed a positive re-
<table>
<thead>
<tr>
<th>Effect</th>
<th>Sum of squares</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior knowledge</td>
<td>0.321</td>
<td>0.678</td>
<td>0.411</td>
</tr>
<tr>
<td>First factor of general attitude toward reviews</td>
<td>0.055</td>
<td>0.117</td>
<td>0.733</td>
</tr>
<tr>
<td>Second factor of general attitude toward reviews</td>
<td>0.068</td>
<td>0.144</td>
<td>0.705</td>
</tr>
<tr>
<td>Review quantity</td>
<td>53.326</td>
<td>112.680</td>
<td>0.001</td>
</tr>
<tr>
<td>Review quality</td>
<td>14.461</td>
<td>30.556</td>
<td>0.001</td>
</tr>
<tr>
<td>Involvement</td>
<td>1.184</td>
<td>2.502</td>
<td>0.115</td>
</tr>
<tr>
<td>Review quantity * Review quality</td>
<td>7.906</td>
<td>16.706</td>
<td>0.001</td>
</tr>
<tr>
<td>Review quantity * Involvement</td>
<td>1.161</td>
<td>2.452</td>
<td>0.118</td>
</tr>
<tr>
<td>Review quality * Involvement</td>
<td>4.488</td>
<td>9.483</td>
<td>0.002</td>
</tr>
<tr>
<td>Review quantity * Review quality * Involvement</td>
<td>3.917</td>
<td>8.277</td>
<td>0.004</td>
</tr>
</tbody>
</table>

**Table 3. ANCOVA Results.**

![Graph showing two-way interactions](image)

**Figure 1. Two-Way Interactions (Review Quantity × Involvement and Review Quality × Involvement) for Purchasing Intention**

relationship between attitude change and number of reviews regardless of the review quality. Hence, they were persuaded via the simple decision-making tool "The more, the better." For high-involvement, all effects—review quantity \(F(1, 169) = 76.993, p < 0.001\), review quality \(F(1, 169) = 48.249, p < 0.001\), and the interaction of review quantity and quality \(F(1, 169) = 26.376, p < 0.001\)—were significant. The results are shown in the graph on the right of Figure 2. As can be seen, the purchasing intention of high-involvement subjects under both the high- and low-quality conditions increased with the review quantity, but the change was greater in the high-quality condition than the low-quality condition. Since each on-line consumer review was regarded as the argument message from a previous consumer, more high-quality reviews means that there were a greater number of persuasive arguments, leading to more persuasion. In addition, the review quantity positively affected purchasing intention even when the review quality was low. Petty and Cacioppo reported the joint tendencies for increasing the number of strong arguments to increase agreement, but for increasing the number of weak arguments to decrease agreement [36]. The present results (focusing on on-line consumer reviews) differed from the results of the earlier studies (focusing on advertisements)
when subjects under the high-involvement condition were given low-quality reviews (weak arguments). A review, in contrast to an advertising argument, can be a recommender even if its content is not helpful, so high-involvement subjects may have considered many reviews as a signal representing product popularity, and processed it through a central route. The role of on-line consumer reviews as a recommender may lead to an increase in the purchasing intention of high-involvement subjects.

These explanations were supported by an additional analysis using process measures of the two roles of on-line consumer reviews. The purpose of this analysis was to find the underlying mechanism by which reviews affect purchasing intention. As suggested earlier in this paper, on-line consumer reviews play both an informant role and a recommender role. Consumers acquire user-oriented information from reviews playing an informant role. Thus, their perceptions of the informativeness of the review information set (defined as how much useful information all the reviews provide [18]) depend on review quality, quantity, and involvement. If they obtain more useful information from the review information set, their perception of the informativeness of the review information set will increase. This variable was measured using two items, “reviews provide useful information about the product” and “review information is helpful for me to understand the product,” with 1 as strongly disagree and 6 as strongly agree [18, 33]. In addition, consumers can obtain a sense of the popularity of a product through on-line consumer reviews playing a recommender role. That is, consumers can infer the product's popularity from how many people bought the product and how they evaluated it. The perceived popularity of a product, defined as how many people like or enjoy it, was measured using two items “the product is popular” and “the product is liked by a lot of people,” with 1 as strongly disagree and 6 as strongly agree [44]. These measurements were subjected to reliability analysis and validity analysis. The factor analysis revealed that these measurements had two factors (perceived informativeness: eigenvalue = 2.406 and Cronbach's $\alpha = 0.93$; perceived popularity: eigenvalue = 1.304 and Cronbach's $\alpha = 0.92$).
Table 4. Descriptive Statistics of Perceived Popularity and Perceived Informativeness.

Table 4 presents the perceived informativeness and perceived popularity of each condition. For the perceived informativeness, the effect of three-way interaction was significant \[F(1, 337) = 10.291, p < 0.001\]. Low-involvement subjects perceived reviews as more informative as the number of reviews increased \[F(1, 169) = 111.183, p < 0.001\], but other effects were not significant. That is, the change of mean values was statistically significant from one review to six reviews but not from low quality to high quality. On the other hand, all the effects on the perceived informativeness of high-involvement subjects were significant (review quantity \[F(1, 169) = 55.513, p < 0.001\], review quality \[F(1, 169) = 88.035, p < 0.001\], and the interaction of review quantity and quality \[F(1, 169) = 29.836, p < .001\]). That is, the change of mean values from one review to six reviews was statistically significant when high-quality reviews were offered, but not along review quantity when low-quality reviews were offered. For the perceived product popularity resulting from on-line consumer reviews as a recommender, only the effect of the review quantity was significant \[F(1, 337) = 227.674, p < .001\]. Subjects in both high- and low-involvement conditions perceived the experimental product as more popular as the number of reviews increased. The effects of review quality on perceived popularity were not significant for either high- or low-involvement subjects. These results are shown in Figure 3. They indicate that the perceived informativeness of high-involvement subjects does not change as the number of low-quality reviews increases, but their perceptions of popularity increase with the number of low-quality reviews.

The perceived popularity and informativeness of the review information set both influence purchasing intention. Previous studies suggest that consumers have a social desire to conform to the expectations of others, so they often decide how to behave by observing the behavior of others [8]. The perceived popularity of a product shown via on-line consumer reviews gives evidence of social desirability, and therefore increases purchasing intention. The relationship between the perceived informativeness and purchasing intention is studied in the advertisement informativeness literature. Previous
Figure 3. The Underlying Mechanism of the Two Roles of Online Consumer Reviews on Purchasing Intention
studies suggest that the more informative the information set is, the more favorable associations consumers have, resulting in an increase in behavioral intention [36].

Regression analyses were conducted to check the effects of perceived informativeness (informant role) and popularity (recommender role) on purchasing intention. The independent variables were perceived informativeness and popularity, and the dependent variable was purchasing intention. The results of the analysis are presented in Table 5. As can be seen, perceived popularity and informativeness had a positive and significant effect on purchasing intention for all subjects. More interesting, however, is that the strengths of the two independent variables were different depending on the level of involvement. For low-involvement subjects, perceived popularity (β = 0.228, p < 0.003) had a stronger effect than perceived informativeness (β = 0.190, p < 0.014). On the other hand, for high-involvement subjects, perceived informativeness (β = 0.410, p < 0.001) had a stronger effect than perceived popularity (β = 0.235, p < 0.001). These results mean that low-involvement consumers consider the recommender role more important than the informant role, but high-involvement consumers considered the informant role more important than the recommender role. Since involvement is related to the motivation of information-processing, high-involvement consumers are willing to elaborately process the focal messages to get additional product information from on-line consumer reviews rather than use them as a signal of product popularity. In contrast, low-involvement consumers are not likely to engage in elaborate message-processing, and therefore rely on the messages as a simple sign of product popularity.

In sum, on-line consumer reviews, unlike advertisement messages, play a dual role for consumers. The informant and recommender roles are both positively related to the consumer purchasing intention. Low-involvement consumers focus on the peripheral cue of showing popularity (recommender role) regardless of review quality (informant role). High-involvement consumers focus not only on the product information obtained from reviews (informant role) but also on the product popularity shown by the reviews (recommender role). When high-involvement consumers are given low-quality reviews, they do not acquire additional useful product information, but they are still affected because the reviews are a signal of product popularity. Finally, a signal of the recommender role increases purchasing intention, which makes the results of this study different from the results of previous studies.

**Conclusion and Discussion**

Three major findings emerge from the research described in this paper. First, the quality of on-line consumer reviews has a positive effect on consumer purchasing intention. Reviews that are logical and persuasive, with sufficient reasons based on specific facts about the product, have a strong positive effect on purchasing intention. Second, consumers’ purchasing intention increases along with the number of reviews. The existence of many reviews indicates that the product is popular, and this is what increases purchasing intention.
<table>
<thead>
<tr>
<th></th>
<th>Full</th>
<th>Low involvement</th>
<th>High involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANOVA: F-value (p-value)</td>
<td>40.061</td>
<td>11.136</td>
<td>33.327</td>
</tr>
<tr>
<td></td>
<td>(p &lt; 0.001)</td>
<td>(p &lt; 0.001)</td>
<td>(p &lt; 0.001)</td>
</tr>
<tr>
<td>R²</td>
<td>0.188</td>
<td>0.116</td>
<td>0.278</td>
</tr>
<tr>
<td>Constant</td>
<td>b</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.786</td>
<td>2.062</td>
<td>1.522</td>
</tr>
<tr>
<td></td>
<td>t-value</td>
<td>9.984</td>
<td>7.380</td>
</tr>
<tr>
<td></td>
<td>(p &lt; 0.001)</td>
<td>(p &lt; 0.001)</td>
<td>(p &lt; 0.001)</td>
</tr>
<tr>
<td>Perceived popularity</td>
<td>b</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.167</td>
<td>0.165</td>
<td>0.168</td>
</tr>
<tr>
<td></td>
<td>beta</td>
<td>0.233</td>
<td>0.228</td>
</tr>
<tr>
<td></td>
<td>t-value</td>
<td>4.581</td>
<td>2.975</td>
</tr>
<tr>
<td></td>
<td>(p &lt; 0.001)</td>
<td>(p &lt; 0.003)</td>
<td>(p &lt; 0.001)</td>
</tr>
<tr>
<td>Perceived informativeness</td>
<td>b</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.206</td>
<td>0.134</td>
<td>0.292</td>
</tr>
<tr>
<td></td>
<td>beta</td>
<td>0.304</td>
<td>0.190</td>
</tr>
<tr>
<td></td>
<td>t-value</td>
<td>5.975</td>
<td>2.476</td>
</tr>
<tr>
<td></td>
<td>(p &lt; 0.001)</td>
<td>(p &lt; 0.014)</td>
<td>(p &lt; 0.001)</td>
</tr>
</tbody>
</table>

Table 5. Regression Results.

These two findings can be interpreted as the effects of the quality and quantity of on-line word-of-mouth messages.

Third, this paper shows the significant review quality × involvement interaction effect, and the insignificant review quantity × involvement interaction effect. Low-involvement consumers are affected by review quantity rather than quality. On the other hand, high-involvement consumers are affected both by review quantity and by review quality. The effect of review quality on high-involvement consumers is more pronounced with a sizable number of reviews, whereas the effect of review quantity is significant even when the review quality is low. This result, which is not the same as the prediction from ELM, is explained by the role of on-line consumer reviews as a recommender. Even though low-quality reviews do not give useful information about a product, they increase the purchasing intention of high-involvement consumers because the review quantity shows that many people have bought and recommended the product. High-involvement consumers regard review quantity as a useful signal of product popularity and not simply as a peripheral cue.

This study makes several practical contributions. Its major results emphasize the importance of properly managing on-line consumer reviews. Since on-line reviews function both as informants and recommenders, they can be used strategically as a communication channel. For example, on-line sellers can provide a review format that enables reviewers to post high-quality reviews focusing on the informant role of on-line consumer reviews (providing user-oriented information to improve consumers’ understanding of a product). If reviews are presented in a matrix format based on reviewers and a check system for attributes or product-usage situations, consumers can easily obtain information on the product. Sellers can also offer rewards or incentives for consumers who
post good reviews. In addition, sellers can show reviews ordered by quality rather than date, especially for high-involvement consumers.

Focusing on the recommender role of on-line consumer reviews (showing product popularity), it is effective to use a tool that shows a summary of information that represents how many reviews there are and how good the overall evaluation is. The total number of reviews and star ratings can be used as anchors for purchasing decisions. Since consumers can easily know how many people recommend a product through this tool, it is useful for consumers to predict a product's popularity, and this will increase their purchasing intention, especially for the low-involvement consumers.

Consumer involvement is an important strategic factor. Both low-involvement consumers and high-involvement consumers are important to marketers making a strategic plan [26]. Low-involvement consumers may not be very interested in buying products at the moment, but they should not be treated as “nonprofitable consumers.” Instead, they should be treated as “potential consumers” for the long-term profit of companies. For the short term, companies tend to think that low-involvement consumers are less important than high-involvement consumers, so they consider review quality as the important thing, focusing on the high-involvement consumers. However, for the long term, marketers should set strategies to attract potential consumers to gain a competitive position in the market. Marketers should adopt a variety of tactics to attract these potential consumers. Previous studies suggest nonbrand strategies for low-involvement consumers [19]. According to the studies, it is very important for low-involvement consumers to be given signals or peripheral cues that stimulate their interest in a product. The study suggests that review quantity plays the same role. Involvement can be detected through click-stream data because on-line shopping tasks differ with the level of involvement. For example, the searching task is close to high-involvement action, while the browsing task is related to low-involvement action [23]. Using click-stream data, on-line sellers can categorize consumers by level of involvement and show reviews that fit their involvement up front. Once sellers develop a system for recommending appropriate reviews to consumers involved at both high and low levels, the effects of on-line consumer reviews will be more convincing.

**Limitations and Future Research**

The present study has several limitations. First, purchasing intention was measured with only two items. Since the construct demonstrated adequate reliability and construct validity, this limitation did not have a serious effect on the research findings, but the reliability of future research could be enhanced by using more items to measure the construct. Second, the study did not adequately control other variables that can influence the effect of on-line consumer reviews. Negative reviews and mixed-quality reviews were neglected in order to create a simple research design. Further research removing these variables one by one should be conducted. Finally, the level of involvement manipulated consumers' elaboration likelihood. Consumer knowledge is a
factor that can affect elaboration likelihood. For example, consumers with low expertise in the product category who are buying or shopping on-line in general may be more affected more by the quantity of reviews, while consumers with high expertise will look at their quality. This issue needs to be analyzed in the future.

Despite these limitations, the research summarized in this paper presents the effect of on-line consumer reviews along with several implications. Many other interesting questions remain unanswered, however, and require further investigation. First, this investigation focused on positive on-line consumer reviews. On-line consumer reviews may have a different effect on purchasing intention when there are some negative reviews. Second, the study can be extended by considering other variables. Prior knowledge can affect perceptions of on-line consumer reviews because it is an important factor in information-processing. Product category depending on enduring involvement may have an effect on the information-processing of on-line consumer reviews. Both enduring involvement from product categories and situational involvement are based on the same construct—perceived relevance as related to information-processing motivation. The expected results of the effects of product categories will be similar to the results of this study as long as there is situational involvement. In the case of low-involvement products like toilet paper, consumers usually have low motivation to engage in effortful message-processing, so the simple signal of product popularity inferred from the number of reviews will affect purchase intention regardless of the review type. In contrast, consumers are willing to focus on focal messages of the reviews when searching for high-involvement products such as laptop computers. Thus, the type of review may also influence purchasing intention. The effects of on-line consumer reviews can be generalized through these further studies.

REFERENCES

Appendix

Please indicate the degree to which you would agree with the following statements by choosing a number from 1 to 6, where 1 indicates "strongly disagree" and 6 indicates "strongly agree." (The same scale was used for each of the questions below.)

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6 Strongly agree</th>
</tr>
</thead>
</table>

**General Attitude Toward Reviews**

1. When I buy a product on-line, I always read reviews that are presented on the Web site.
2. When I buy a product on-line, the reviews presented on the Web site are helpful for my decision making.
3. When I buy a product on-line, the reviews presented on the Web site make me confident in purchasing the product.
4. If I do not read the reviews presented on the Web site when I buy a product on-line, I worry about my decision.
5. When I buy a product on-line, reading the reviews presented on the Web site impose a burden on me.
6. When I buy a product on-line, reading the reviews presented on the Web site irritates me.

**Review Quality**

1. Each review has sufficient reasons supporting the opinions.
2. Each review is objective.
3. Each review is understandable.
4. Each review is credible.
5. Each review is clear.
6. In general, the quality of each review is high.
**Review Quantity**

1. The number of reviews is large.
2. The quantity of review information is large.

**Review Positiveness**

1. Reviewers positively evaluate the product.
2. In general, reviewers recommend the product.

**Product Information (Seller-created Information)**

1. The product information is objective.
2. The product information is understandable.
3. The product information is credible.
4. The product information is clear.

**Perceived Informativeness of the Review Information Set**

1. The reviews provide useful information about the product.
2. The review information is helpful for me to understand the product.

**Perceived Product Popularity**

1. The product is popular.
2. The product is liked by a lot of people.

DO-HYUNG PARK (prehero@business.kaist.ac.kr) is a doctoral candidate at the Korea Advanced Institute of Science and Technology Business School, where he received his bachelor’s degree in industrial management and his master’s degree in management engineering. His research interests include electronic word-of-mouth, consumer behavior in electronic commerce, user behavior in virtual communities, and Internet marketing.

JUMIN LEE (leemin@business.kaist.ac.kr) is a Ph.D. candidate in the Department of Management Information Systems, Korea Advanced Institute of Science and Technology Business School, where she earned her bachelor’s degree and master’s degree in electrical engineering and computer science. Her research interests include user behavior in e-commerce, virtual communities, and human-computer interaction.

INGOO HAN (ijnhan@kgsm.kaist.ac.kr) is a professor at the Korea Advanced Institute of Science and Technology Business School. He received his doctorate from the University of Illinois at Urbana-Champaign. His research interests are electronic commerce, virtual communities, and artificial intelligence applications in accounting and finance. His recent research issues have included consumer behavior in electronic commerce,