eWOM overload and its effect on consumer behavioral intention depending on consumer involvement

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Abstract

Online consumer reviews involving experiences, evaluations and opinions on products from previous consumers play two roles – an informant and a recommender. These two roles affect a consumer’s intention. However, there is a conflict between two roles when a large number of reviews are offered. From the perspective of the recommender role, consumers have more favorable attitude toward a product as a greater number of positive reviews are offered while consumers may be confronted with too much information, which results in information overload. This study investigates what consequences the tradeoff between two roles has on purchasing intention depending on consumer involvement.

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Keywords: Electronic word-of-mouth; Online consumer review; Information overload; Elaboration likelihood model; Involvement

1. Introduction

Since the development of the World Wide Web (WWW) on the Internet in the early 1990s, an increasing number of companies have been trying to carry out electronic commerce (EC) [8]. Through EC, a close customer relationship can be formed, and much of the operating overhead including time and money can be saved. Recently, the WWW is used as a new marketing channel to show recommendations from previous consumers [20]. The online consumer review, one type of electronic word-of-mouth (eWOM), involves positive or negative statements made by consumers about a product for sale in Internet shopping malls. This consumer-created information is helpful for decision-making on purchases because it provides consumers with indirect experiences [27]. There is recent empirical evidence that consumer reviews have become important for product sales [2,9,10].

An online consumer review as a route for social influence [13] plays two roles – as an informant and a recommender [27]. As an informant, online consumer reviews deliver additional user-oriented information. As a recommender, they provide either a positive or negative signal of product popularity. Since consumers request product information and its recommendation information simultaneously for purchasing a product, in order to learn about it and reduce uncertainty [5,33], online consumer reviews playing these two roles can completely meet consumers’ information needs.

However, what happens when consumers confront a large number of reviews? It is easily observed that some popular products have too many reviews in online shopping malls. For example, Chevalier and Mayzlin’s study [9] reported that the average number of reviews per book in May 2004 was about 68.31 and the standard deviation was 205.42. From the perspective of online consumer reviews as recommenders, a greater number of positive reviews seem better for a product. However, from the
perspective of online consumer reviews as information providers, consumers may be confronted with too much information, which results in information overload. Therefore, as the number of reviews becomes large, there may be a tradeoff between the negative effect from decreasing review informativeness caused by eWOM overload, and the positive effect from an increase in the strength of the signal of product popularity. Focusing on overall positive reviews, this study tries to find the consequences of the tradeoff.

This study proposes that consumer involvement should be a key moderator to determine the consequences of the tradeoff. According to the elaboration likelihood model (ELM), individuals who are highly involved with a product are more likely to engage in thoughtful and effortful processing of persuasive arguments. Individuals who are less involved are not affected by the argument contents, but rather by non-content elements (peripheral cues) [29]. High-involvement consumers may consider the informant role as being more important than the recommender role because such consumers are willing to elaborate process the focal messages to get additional product information from online consumer reviews rather than use them as a signal of product popularity. On the other hand, low-involvement consumers may consider the recommender role as being more important than the informant role because such consumers are not likely to elaborate process information, therefore they rely on them as a simple sign of product popularity. Finally, consumer involvement determining which part is more important may moderate the consequences from the tradeoff between the informant and recommender role, and explain the change in consumer purchasing intention from the tradeoff.

In this study, controlling the review valence as overall positive, we suggest several hypotheses and conduct an experiment to address the above issues. Focusing on the two factors of review structure (the type and the number of reviews), we investigate how they affect the perceived review informativeness (informant role) and popularity of a product (recommender role) and when information overload occurs in the context of online consumer reviews. Furthermore, we investigate what consequences the tradeoff between the informant role and the recommender role has on purchasing intention depending on consumer involvement.

2. Theoretical background and hypotheses

2.1. The dual role of online consumer reviews

Research on the use and influence of recommendations on consumers has typically been subsumed under word-of-mouth (WOM). Consumers may follow others’ opinion as a result of overt conformity pressures from peer groups, in response to concerns about what others may think of them, or they may react to their product choice and usage [3], or because others have provided credible information regarding a product’s value [11]. Deutsch and Gerard [13] distinguished two types of influence processes – informational and normative. Informational influence occurs when an individual accepts information from others as evidence about reality, e.g., evidence about what others believe to be the true qualities of a product. Normative influence occurs when the individual conforms to expectations of another person or group. Early research regarding social influence on consumer behavior [35] concluded that normative pressures were operative in public/group settings and that individuals tended to conform to group opinions.

Online consumer reviews, one type of eWOM communication, affects consumer behavior through these two routes. Online consumer reviews deliver others’ normative beliefs, indicating whether other consumers like or dislike a product. In accordance to the valence of reviews, normative influences can occur in a different way. When reviews about a product are overall positive, potential consumers are likely to think the product is desirable in conformity to the reviewers. In contrast, when they read overall negative reviews of a product, consumers may reject or dislike it because disagreeing with others is likely to cause psychological discomfort.

The number of reviews can affect the level of conformity. Asch [1] found that conformity increased as a direct function of the size of the reference group. Campbell and Fairey [7] concluded that group size was a factor that enhanced normative pressure. They proposed that increases in group size should have stronger effects on conformity. In the context of online consumer reviews, consumers regard reviewers as one group of consumers. If the number of positive reviews increases, the size of the reference group recommending a product will increase as well because one previous buyer usually creates an online consumer review. Increases in the number of reviews are likely to lead consumers to rationalize their purchasing decision by telling themselves, “many other people also bought the product, so it can be a popular product,” in conformity with previous consumers, inferring that the product is becoming popular and its sales increases. For example, a consumer is likely to infer that a product is more popular when he/she reads many positive reviews than when he/she reads a few reviews. That is supported by the empirical results of previous studies on online consumer reviews, indicating that the number of ratings has a significant impact on sales [9,10]. Therefore, we propose the following hypothesis.

**Hypothesis 1.** The greater the number of positive online consumer reviews, the greater the perceived product popularity.

Online consumer reviews play an informant role, so they have informational influence like consumer conformity. Online consumer reviews mainly provide user-oriented information describing a product in terms of usage situations, and measure the product performance from a user’s perspective [5]. The informational influence of online consumer reviews can vary with the type of reviews. Since a
reviewer who already bought a product can freely express his/her evaluation without any standard format, each review is different. Some reviews such as “I can’t believe I got this. I’m proud of this” are subjective, emotional and have no support for arguments. These kinds of reviews are simple-recommendation reviews. On the contrary, some reviews provide attribute-value information such as “This product is twice as fast as similar products and even cheaper,” which are specific, clear and having reasons for arguments.

In this study, we categorized the reviews into two types. Attribute-value reviews are rational, objective and concrete based on the specific facts about a product. On the other hand, simple-recommendation reviews are emotional, subjective, and abstract based on the consumer feeling about a product. Much research on message contents shows that strong messages which are rational and objective are more effective than weak ones which are emotional and subjective [28,30]. According to these studies, it is predicted that attribute-value reviews are perceived as being more informative than simple-recommendation reviews.

The impact of the number of reviews on perceived informativeness of the review information set may be different according to the type of reviews. Generally, from the perspective of message quantity, when more reviews are offered, consumers perceive the review information set as being more informative [30]. An increase in the number of reviews leads to an increase in the number of different arguments supporting product recommendations on the basis of specific facts. However, an increase in the number of simple-recommendation reviews usually delivers more various feelings about the product not more specific reasons for the purchase. Finally, it is predicted that the impact of the number of online consumer reviews on the perceived informativeness of the review information set is stronger with attribute-value reviews than with simple-recommendation reviews.

**Hypothesis 2.** Attribute-value reviews are perceived to be more informative than simple-recommendation reviews.

**Hypothesis 3.** The impact of the number of reviews on perceived informativeness of the review information set is stronger for attribute-value reviews than simple-recommendation reviews.

### 2.2. Information overload in the context of online consumer reviews

Today’s consumers face richer information environments than ever before [21]. Too much information brings about the information overloading phenomenon [23]. Information overload is the phenomenon of too much information overwhelming a consumer, causing adverse judgmental decision making. Consumers’ limited processing capacity can become cognitively overloaded if they attempt to process “too much” information in a limited time, and this can result in confusion, cognitive strain, and other dysfunctional consequences [23]. The previous studies showed that a user’s effectiveness suffers and his/her perception of informativeness decreases when too much information is readily available [17,18].

Usually, an online consumer review is created after a product is sold. As a result, an increase in sales leads to an increase in the number of online consumer reviews. In addition, at present, there is no computer tool to control the quantity of online consumer reviews. When buying a product, consumers have a tendency to process all available information. As a result, a large number of reviews impose a heavy burden on consumers, so they may read some of them carefully and use skimming or scanning reading strategy to catch the general idea of unselected reviews. During this information processing, they are likely to be concerned about the detailed information that they miss, resulting that they become less satisfied, less confident, and more confused when provided with too much information. Even though there are overall positive reviews only, consumers may want a moderate quantity of information to process completely not a large quantity of information to process incompletely. In addition, they may even blame online sellers for this confusion from information overload caused by the lack of managing reviews. Finally, it is predicted that these result in unfavorable consequences such as a decrease in perceived informativeness of the review information set.

Traditional approaches for measuring the amount of information provided to consumers involve simple counts of the number of alternatives and attributes in a choice set [17–19]. These counts are then used to make predictions about decision processes and the quality of consumer choices. However, Schneider’s study [34] argues that overload usually occurs when the nature of the information is uncertain, ambiguous, novel, complex, or intense. Lurie [21] argues that the likelihood of information overload depends on multiple structural factors of information such as information formats or types. Information structure has important implications for information acquisition, the amount of information processing, and decision quality.

In this study, two dimensions of review structure are considered to predict information overload: the number of reviews and the type of reviews. In the context of online consumer reviews, information quantity may not be measured simply by counting reviews. Information overload should be viewed from a qualitative point of view because there are various types of reviews from simple recommendation to attribute-value information. Each type of review needs a different level of cognitive resources. Attribute-value reviews require more cognitive resources than simple-recommendation reviews. Simple-recommendation reviews provide emotional and subjective opinions with the consequence that they can be understood easily at a glance. On the other hand, it takes more efforts and a longer time to catch the general idea of attribute-value reviews. If the quantity of information (the number of reviews) is the same, the consumers who read attribute-value reviews feel
more loaded than the ones who read simple-recommendation reviews. It is expected that information overload comes earlier for consumers with attribute-value reviews than for those with simple-recommendation reviews. Hence, we propose the following hypothesis.

**Hypothesis 4.** Information overload comes earlier with attribute-value reviews than with simple-recommendation reviews.

### 2.3. The effects of the dual roles of online consumer reviews on purchasing intention

Both the perceived popularity and informativeness of the review information set can influence purchasing intention. Previous studies suggest that consumers have the social desirability to conform to the expectations of others, so they often determine their behavior by observing the behavior of others [36]. In addition to the influence of significant others such as spouses, relatives, and friends, consumers are often swayed by the sheer weight of popular opinion [32]. Marketers have long been aware of the power of social expectations, and popularity claims are often used in product advertisements (e.g., four out of five dentists recommend). Bettman et al. [4] argued the need to justify one’s decisions to others leads consumers to choose popular options that provide easy rationales or justifications. Also, according to the social desirability hypothesis from the study of [32], the perceived popularity of a target positively affects brand preference, including brand choice, future purchase intent, monetary allocation, and overall evaluation. Therefore, it is predicted that the perceived popularity of a product shown via online 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 studies suggest that the more informative the information set is, the more favorable associations consumers have, resulting in an increase in behavioral intention [30]. We expect that, if positive arguments about a product dominate online consumer reviews, the perceived informativeness of the review information set positively affects purchasing intention. Even though consumers know that there are a few weak points from a few negative reviews, consumers can understand many more good points from many positive reviews, so they follow the positive recommendation in conformity with many positive reviewers. However, if the number of negative reviews about a product increases, consumers will learn its many disadvantages as well as advantages. That leads them to perceive the review information set as being informative, but such perceived informativeness has a negative effect on purchasing intention. Finally, it is predicted that review valence moderates the relationship between perceived informativeness of the review information set and consumer purchasing intention. If the total review valence is positive (negative), the perceived informativeness will have a positive (negative) effect on purchasing intention. The research scope of this study is the context of overall positive reviews, so we propose the positive-side hypothesis.

**Hypothesis 5.** Perceived product popularity positively affects purchasing intention.

**Hypothesis 6.** For overall positive reviews, perceived informativeness of the review information set positively affects purchasing intention.

### 2.4. The tradeoff between the informant and the recommender in information overload

The effects of the informativeness of reviews and the popularity of a product on purchasing intention can be moderated by the level of involvement according to the elaboration likelihood model (ELM) [30]. ELM is a social psychology model concerning the information processing of persuasive messages. ELM posits that individuals who have the motivation and the ability to process a message are more likely to process persuasion attempts via the central route. In other words, they are more likely to engage in thoughtful and effortful processing of persuasive arguments and attend to the persuasive arguments, and then generate their own thoughts in relation to the arguments. However, individuals lacking motivation or ability are more likely to process the information via the peripheral routes, which are mental shortcuts, by focusing on non-content cues.

ELM researchers have found that issue-relevant arguments and product-relevant attributes were more influential under high-involvement conditions while peripheral cues were more influential under low-involvement conditions [28].

When consumers are involved in the low-involvement process of online consumer reviews, they engage in peripheral processing by focusing on non-content cues such as a signal showing the product popularity. They are not likely to consider the review content. Thus, they are more affected by the perceived product popularity rather than the perceived informativeness of the review information set. On the other hand, consumers in high involvement are more likely to process persuasion attempts via the central route so that review content is important for them. That is, they put more weights on the perceived informativeness of the review information set rather than the perceived product popularity.

**Hypothesis 7.** For low-involvement consumers, the impact of the perceived product popularity on purchasing intention is greater than the impact of the perceived informativeness of the review information set on purchasing intention.

**Hypothesis 8.** For high-involvement consumers, the impact of the perceived informativeness of the review information set on purchasing intention is greater than the impact of the perceived product popularity on purchasing intention.
Consumers experience information overload from a large number of reviews, resulting in a decrease in the perceived informativeness of the review information set. The decrease is regarded as an undesirable consequence of the informant role of online consumer reviews. On the other hand, the recommender role of online consumer reviews creates more desirable outcomes such as an increase in the perceived product popularity along with the number of reviews. The consequences of the tradeoff between the informant role and the recommender role can be moderated according to the level of consumer involvement.

Low-involvement consumers consider perceived product popularity as being more important than perceived informativeness of the review information set. Thus, even though information overload occurs, an increase in the perceived popularity may dominate a decrease in the perceived informativeness of reviews. It is predicted that the purchasing intention of low-involvement consumers increases along with the number of all reviews. On the other hand, when high-involvement consumers are given a large number of attribute-value reviews, a decrease in the perceived informativeness of reviews may dominate an increase in the perceived popularity because the impact of the perceived informativeness of the review information set on purchasing intention is greater than that of the perceived product popularity. Thus, it is predicted that the purchasing intention of high-involvement consumers decreases when information overload occurs.

Hypothesis 9. The purchasing intention of high-involvement consumers initially increases then decreases, gradually, with the number of attribute-value reviews, drawing an inverted U shape.

Hypothesis 10. The purchasing intention of high-involvement consumers improves with the number of simple-recommendation reviews.

Hypothesis 11. The purchasing intention of low-involvement consumers improves with the number of attribute-value reviews.

Hypothesis 12. The purchasing intention of low-involvement consumers improves with the number of simple-recommendation reviews.

3. Research design and method

3.1. Design, participants, and experimental system

We employed a $2 \times 3 \times 2$ factorial design. The three independent variables were review type (simple recommendation and attribute-value information), review quantity (small, moderate, and large number of reviews), and involvement (low and high). Three hundred thirty four college students participated in this experiment voluntarily. Their average age was 23.6 years. Random assignment to each of the cells was performed. A reward of US$5 was given to each of the participants. Most of them already had purchase experiences in online shopping malls. In particular, many of them had purchased electronic goods online.

The PMP (Portable Multimedia Player) was chosen as the experiment product. PMP is a portable next generation multimedia player that plays digital music and video files. There are three reasons for choosing this as the experiment product. First, electronic products are frequently purchased in online shopping malls. Second, consumers tend to rely on the comments from previous users due to the fact that electronic products are complicated. For consumers, the information obtained from sellers may not be enough for decision-making. Third, PMP is a brand-new product for general consumers. Thus, consumers processed the suggested information with no stereotypes about the brand and its product category.

3.2. Independent variables

3.2.1. Online consumer reviews

We created 60 reviews based on real reviews from online shopping malls. Each online consumer review included a title, a poster name and contents. We controlled the length of the reviews regardless review type. The length of each review was set at 3 lines with a font size of 10.

A focus group interview (20 participants who did not participate in the main experiment) was used to decide the level of the number of reviews. They were asked to estimate how many reviews they considered to be small, moderate, or large. When surfing Internet shopping malls, these members generally read 5–6 reviews with 3–4 lines. They sometimes read about 10 reviews. Along these interview results, 3 was selected as small, 9 was selected as moderate, and 27 was selected as large. We can find that some products have more than 100 reviews in Internet shopping malls. Nevertheless, the condition of “a large number of reviews” can be sufficient in terms of giving much information to cause information overload.

The attribute-value reviews contained product-relevant attribute/benefit information. On the other hand, the simple-recommendation reviews consisted of emotional, subjective recommendations. These reviews presented subjective feelings, interjections (Wow! How wonderful! etc.) and non-relative information. We classified the 60 reviews into either attribute-value information or simple recommendation. Table 1 shows the examples. Before the main experiment, a pretest was conducted to check whether these reviews were perceived as we intended. We asked other 20 participants (who did not participate in the main experiment) to classify each review according to the review type. The reviews that all participants selected unanimously as either attribute-value information or simple recommendations were used for the main experiment.
confounding variables and improve the internal validity of this study. The individual differences including personality, cognitive style and personal web experiences, were controlled by randomly assigning the participants to the experimental conditions [16]. The individual differences of general attitude toward reviews were measured by four items, which are reported in the appendix [27].

All groups should equally perceive the quality of product advertisement and the degree of review positiveness for the product. Four measurements for the product advertisement and two measurements for review positiveness are in the appendix. Other variables to change the effects of online consumer reviews should be controlled. The experiment product was brand-new, so product familiarity was controlled in the experiment. Also, the brand effect was no problem since we hid the brand name and information about the brand. Prior knowledge was investigated in the survey by an item with anchors ranging from “I’ve never heard of it” to “I know it well.” Prior knowledge is used as a covariate variable for hypotheses testing.

3.5. Experimental procedure

At the start of the experiment, the participants were told that all the instructions were provided in the survey and that they should read the instructions carefully and complete the experiment independently. First, the participants were manipulated to imagine different scenarios in terms of involvement. Then, a product advertisement and two measurements for review positiveness were provided according to each group’s conditions. The time limit for reading the stimuli was about 5 min. After the stimuli were gone, the participants were asked to fill in the same questionnaire including purchasing intention, manipulation checks, recall checks, and demographics.

4. Research results

4.1. Manipulation and control checks

All variables for manipulation and control checks are factor analyzed. Seven factors were generated. The participants’ responses on the two items designed to check their perception of the quantity of reviews (Eigenvalue = 1.789 and Cronbach’s alpha = 0.879) were averaged. An ANOVA analysis indicated the presence of the main effect of the num-

Table 1

<table>
<thead>
<tr>
<th>Attribute-value review</th>
<th>Simple-recommendation review</th>
</tr>
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<tbody>
<tr>
<td>The picture on the 3.5 in. LCD monitor supports the true colors and the contrast between darks on such a small screen. This PMP converts recorded TV files and syncs with Windows Media Player 10. It plays songs at top level quality with 5.1 channels.</td>
<td>Wooooooww! For many days, I’ve searched and compared every PMP and finally bought one. I’m really enjoying it and it is tough to put it down. Every friend envies my PMP. At this moment I’m writing a review, but I want to play my PMP!!!!!!</td>
</tr>
</tbody>
</table>

3.2.2. Involvement

Consumer involvement is manipulated by giving a different scenario in terms of the amount of goal directedness [22,24]. Participants in high-involvement groups were asked to imagine a scenario where they should buy a PMP product for their business since they worked in the multimedia industry. These instructions created a high level of goal directedness with respondents focusing their attention on PMP-related issues [22]. As opposed to the high-involvement situation, the role-playing instructions for the low-involvement situation completely lacked goal directedness. Participants in the low-involvement condition were simply asked to imagine that they see the product webpage while browsing Internet shopping sites for fun. Through this manipulation, the participants in the high-involvement condition read and processed the product information more carefully while the participants in the low-involvement condition did not.

3.3. Dependent variables

Consumers could assess the popularity of the product through online consumer reviews playing a recommender role. That is, consumers could infer the product’s popularity from how many people bought the product and how they evaluated it. To measure this variable, participants were asked how many other people had bought this product and how popular the product was [36].

Consumers acquire additional user-oriented product information from reviews playing an informant role. Thus, consumers differently perceive the informativeness of the review information set depending on the type and the number of reviews. To measure this variable, four items regarding the perceptions of review information (informative; able to help you understand the product; useful to understand the product; able to offer necessary information) were asked [14,26].

Purchasing intention was measured on two seven-point scales. 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?’ [24].

3.4. Control variables

An online shopping experiment could be affected by the characteristics of the participants and stimulus. Random assignments were used to control the effects of possible confounding variables and improve the internal validity
number of reviews ($F(2, 331) = 817.935, p < .01, \text{mean} = 5.49, 3.29$ and $1.67$). The participants’ responses on the manipulation checks relevant to the type of reviews (Eigenvalue = 4.475 and Cronbach’s alpha = 0.967) were also examined. The ANOVA test indicated that the type of reviews was manipulated as we intended ($F(1, 332) = 50.703, p < .01, \text{mean} = 3.82$ and $3.06$). Finally, the involvement manipulation was checked by using recall scores [29,30]. Participants were asked to check the attributes of the experiment product using eight attributes. Among 8 attributes, 5 were correct ones and 3 are incorrect ones. Participants in the high-involvement condition had a greater number of correct answers than those in the low-involvement condition ($F(1, 332) = 280.687, p < .01, \text{mean} = 7.01$ and $5.18$).

Among groups, there is no significant differences of the quality of product advertisement (Eigenvalue = 3.526, Cronbach’s alpha = 0.951, $F(11, 322) = 0.307, \text{ns}$) and the
degree of positiveness of reviews on the product (Eigen-value = 1.897, Cronbach’s alpha = 0.938, F(11,322) = 1.084, ns). General attitude toward reviews (Eigen-value = 2.432, Cronbach’s alpha = 0.768) and prior product knowledge were significantly different among groups, so these were used as covariate variables for hypothesis testing (F(11,322) = 1.851, p < .05; F(11,322) = 3.396, p < .01).

4.2. Hypothesis testing

The eight items for measuring the perceived product popularity, the perceived informativeness of the review information set and purchasing intention were factor analyzed. The factor analysis revealed that three factors (two items for perceived product popularity: Eigen-value = 1.997, Cronbach’s alpha = 0.98; four items for perceived informativeness of the review information set: Eigenvalue = 3.698, Cronbach’s alpha = 0.98; two items for purchasing intention: Eigenvalue = 1.681, Cronbach’s alpha = 0.75) were generated. The descriptive statistics of perceived product popularity and perceived informativeness of the review information set are in Table 2. An ANCOVA was performed on the perceived product popularity (see Table 3). The type of reviews and the number of reviews were used as independent variables. Results showed only the main effect of review quantity (F(2,326) = 617.177, p < .01) was significant while the effects of other variables including covariates were not significant, indicating that Hypothesis 1 is accepted. The results are shown in the graph on the left in Fig. 2.

We performed an ANCOVA on the perceived informativeness of the review information set (see Table 3). Each covariate variable was not significant. The analysis indicated the presence of two significant main effects of the number of reviews (F(2,326) = 77.901, p < .001) and the type of reviews (F(1,326) = 19.407, p < .001). The review quantity x review quality interaction effect was also significant (F(2,326) = 19.063, p < .001). The results are shown in the graph on the right in Fig. 2. Attribute-value reviews are perceived more informative than simple-recommendation reviews, indicating that Hypothesis 2 is accepted. Also, from a few to moderate number of reviews, the impact of the number of reviews on perceived informativeness of the review information set is stronger for attribute-value reviews than simple-recommendation reviews. Thus, Hypothesis 3 is accepted.

To test Hypothesis 4, we investigated the change of the perceived informativeness along the number of reviews. As seen in the graph on the right in Fig. 2, the perceived informativeness of attribute-value review set initially increases,
Hypothesis 4 is accepted. In "a large number of simple-recommendation reviews" (M27 simple-recommendation reviews = 2.89, \(n = 28\)), the process measure of information overload was stronger than that of the perceived informativeness (Beta = 0.496, \(p < 0.001\)) and participants in "a large number of attribute-value reviews" (M9 attribute-value reviews = 4.98) perceived that there was much more information in the review information set. The result showed that participants in "a large number of attribute-value reviews" perceived that there was much more information in the review information set than the other participants. That is, ANOVA with Fisher's test of least significance difference indicates that participants in "a large number of attribute-value reviews" (M27 attribute-value reviews = 4.98) perceived there is much greater information loads than participants in "a moderate number of attribute-value reviews" (M9 attribute-value reviews = 2.59, \(p < 0.001\)) and participants in "a large number of simple-recommendation reviews" (M27 simple-recommendation reviews = 2.89, \(p < 0.001\)). Thus, Hypothesis 4 is accepted.

To find the effects of perceived informativeness (the informant role) and popularity (the recommender role) on purchasing intention, we conducted regression analyses. The independent variables were perceived informativeness and popularity, and the dependent variable was purchasing intention. The descriptive statistics of purchasing intention is in Table 4. Prior knowledge and general attitude toward reviews were also included in the regression model to control the level of expertise and personal attitude toward reviews. The results of this analysis are presented in Table 5. Results indicated that the effects of perceived popularity and informativeness on purchasing intention were positive and significant for all participants. Thus, Hypotheses 5 and 6 are accepted. To find the moderating role of consumer involvement, we conducted additional regression analyses depending on the level of involvement. As we expected, the strengths of the two independent variables were different depending on the level of involvement. For participants in the low-involvement condition, the effect of the perceived popularity (Beta = 0.496, \(p < 0.001\)) was stronger than that of the perceived informativeness (Beta = 0.201, \(p < 0.001\)). On the other hand, the effect of the perceived informativeness (Beta = 0.389, \(p < 0.001\)) was stronger than that of the perceived popularity

### Table 4
Descriptive statistics of purchasing intention

<table>
<thead>
<tr>
<th></th>
<th>Low involvement</th>
<th>High involvement</th>
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<tbody>
<tr>
<td></td>
<td>Simple-recommendation Reviews</td>
<td>Attribute-value reviews</td>
</tr>
<tr>
<td>3 Reviews</td>
<td>(n = 28)</td>
<td>(n = 28)</td>
</tr>
<tr>
<td></td>
<td>2.55 (0.67)</td>
<td>2.64 (0.51)</td>
</tr>
<tr>
<td>9 Reviews</td>
<td>(n = 28)</td>
<td>(n = 28)</td>
</tr>
<tr>
<td></td>
<td>3.50 (0.65)</td>
<td>3.61 (0.53)</td>
</tr>
<tr>
<td>27 Reviews</td>
<td>(n = 28)</td>
<td>(n = 28)</td>
</tr>
<tr>
<td></td>
<td>4.38 (0.81)</td>
<td>4.02 (0.88)</td>
</tr>
</tbody>
</table>

*Note: Number of subjects (\(n\)), mean of purchasing intention (standard deviation).*

### Table 5
Regression results

<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>43.097 ((p &lt; 0.001))</td>
<td>35.475 ((p &lt; 0.001))</td>
<td>12.963 ((p &lt; 0.001))</td>
</tr>
<tr>
<td>R-square</td>
<td>0.344</td>
<td>0.465</td>
<td>0.244</td>
</tr>
<tr>
<td>Constant</td>
<td>(b)</td>
<td>2.179</td>
<td>1.974</td>
</tr>
<tr>
<td>(t)-value ((p)-value)</td>
<td>20.787 ((p &lt; 0.001))</td>
<td>13.892 ((p &lt; 0.001))</td>
<td>15.982 ((p &lt; 0.001))</td>
</tr>
<tr>
<td>Perceived popularity</td>
<td>(b)</td>
<td>0.157</td>
<td>0.275</td>
</tr>
<tr>
<td>Beta</td>
<td>0.310</td>
<td>0.496</td>
<td>0.166</td>
</tr>
<tr>
<td>(t)-value ((p)-value)</td>
<td>6.215 ((p &lt; 0.001))</td>
<td>6.638 ((p &lt; 0.003))</td>
<td>2.328 ((p &lt; 0.021))</td>
</tr>
<tr>
<td>Perceived informativeness</td>
<td>(b)</td>
<td>0.214</td>
<td>0.119</td>
</tr>
<tr>
<td>Beta</td>
<td>0.383</td>
<td>0.201</td>
<td>0.389</td>
</tr>
<tr>
<td>(t)-value ((p)-value)</td>
<td>7.780 ((p &lt; 0.001))</td>
<td>2.740 ((p &lt; 0.007))</td>
<td>5.402 ((p &lt; 0.001))</td>
</tr>
<tr>
<td>Prior knowledge</td>
<td>(b)</td>
<td>0.059</td>
<td>0.232</td>
</tr>
<tr>
<td>Beta</td>
<td>0.033</td>
<td>0.117</td>
<td>−0.116</td>
</tr>
<tr>
<td>(t)-value ((p)-value)</td>
<td>0.745 ((p &lt; 0.457))</td>
<td>1.987 ((p &lt; 0.049))</td>
<td>−1.637 ((p &lt; 0.104))</td>
</tr>
<tr>
<td>General attitude toward reviews</td>
<td>(b)</td>
<td>0.002</td>
<td>0.025</td>
</tr>
<tr>
<td>Beta</td>
<td>0.002</td>
<td>0.028</td>
<td>−0.040</td>
</tr>
<tr>
<td>(t)-value ((p)-value)</td>
<td>0.046 ((p &lt; 0.964))</td>
<td>0.485 ((p &lt; 0.629))</td>
<td>−0.577 ((p &lt; 0.565))</td>
</tr>
</tbody>
</table>
(Beta = 0.166, p < 0.021) for participants in the high-
involvement condition. The results mean that low-involv-
ment consumers consider the recommender role as being
more important than the informant role, but high-involve-
ment consumers consider the informant role as being 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 online consumer reviews rather than use them as a
signal of product popularity. In contrast, low-involvement
consumers are not likely to elaborately engage in message-
processing, therefore rely on them as a simple sign of prod-
uct popularity. Thus, Hypotheses 7 and 8 are accepted.

When a large number of attribute-value reviews are
offered, consumers experience information overload. Informa-
tion overload results in a decrease in the perceived infor-
mativeness of the review information set. However, the
perceived product popularity increases with the number
of reviews regardless of the occurrence of information
overload. To find which one dominates, we examined the
purchasing intention for each condition. The results are
in Fig. 3. For high-involvement consumers, the purchasing
intention has an inverted U shape as the number of attrib-
ute-value reviews increases. From the moderate number
to the large number of reviews, a decrease in the perceived
informativeness dominates an increase in the perceived
popularity. Thus, Hypothesis 9 is accepted. When simple-
recommendation reviews are given to high-involvement
consumers, purchasing intention slightly increases until
there are a moderate number of reviews. However, there
is no further change with a large number of reviews. The
persuasiveness of messages is important for high-involve-
ment consumers, but simple-recommendation reviews are
less persuasive in changing their purchasing intention
greatly. High-involvement consumers may use the first sev-
eral simple-recommendation reviews to form their purchas-
ing intention, but think the additional reviews have no new
information for their decision making. In addition, they
put less weight on the signal of popularity which becomes
apparent along with the number of reviews. Finally, high-
involvement consumers change their purchasing intention
to some degree, but retain it despite a continuous increase
in the number of reviews. Our Hypothesis 10 is rejected.

For low-involvement consumers, the purchasing inten-
tion increases with the number of reviews regardless of
the type of reviews. An increase in the perceived popularity
dominates a decrease in the perceived informativeness, and
the result is that the purchasing intention of low-involve-
ment consumers improves with the number of all reviews.
However, the degree of the increase in the purchasing
intention is greater when simple-recommendation reviews
are offered than when attribute-value reviews are offered
because participants in the low-involvement condition also
experienced information overload caused by a large num-
ber of attribute-value reviews. Finally, Hypotheses 11
and 12 are accepted.

5. Conclusion

Four major findings emerge from this research. First,
this study hypothesized and validated the effects of two fac-
tors of the review structure (the number and the type of
reviews) on the dual roles of online consumer reviews
(the informant role and the recommender role). The num-
ber of reviews increases the perceived popularity of a prod-
uct (the recommender role). The type of reviews and the
number of reviews increase the perceived informativeness
of the review information set (the informant role), and
the interaction effect also exists.

Second, this study shows information overload can
occur in the context of eWOM. Previous studies on
WOM suggest that the greater the number of positive
WOM messages is, the better it is for the product

Fig. 3. The interaction effect of the type of reviews × the number of reviews × involvement for purchasing intention.
These studies have not considered information overload. Since WOM plays the informant role as well as the recommender role, consumers can experience information overload. Schneider’s study [34] argues that overload usually occurs when the nature of the information is uncertain, ambiguous, novel, complex, or intense. In addition to such nature of information, this study argues that, even though the information quantity (total length of given reviews) is the same, the information type also can be a factor affecting the information overload. Information overload comes earlier when the messages requiring more cognitive resources are offered. The results emphasize how to manage reviews from the qualitative perspective as well as quantitative perspective in order to prevent consumers from experiencing information overload.

One more finding of this study is that the consequences of information overload are not always bad. Online consumer reviews play a recommender role as well as an informant role, so a large number of reviews deliver the signal of product popularity with a variety of product information. This study shows that low-involvement consumers focusing on perceived popularity overcome the information overload, resulting in an increase of their purchasing intention. Previous studies usually reported the negative consequences of information overload such as a decrease in decision quality [17–19]. However, this study argues the consumer characteristics such as consumer involvement can moderate the outcomes of information overload by determining which part of the information is the focus.

Online sellers have used some tools to help with eWOM overload. They have used a tool that shows a summary of the information that represents how many reviews there are and how good the overall evaluation is. In addition, a tool to show the first line and hide the remaining lines of each review may reduce information overload. Nevertheless, online sellers still need to make more effort to manage online consumer reviews. We propose several new ways to overcome eWOM overload. First, online sellers can give reviews with a standardized format. If the review format is standardized, consumers can understand reviews more easily and spend less time to collect information they want. Second, online sellers can give personalized reviews by using personal information that consumers input when registering membership. Since each consumer has a different evaluation scheme, online sellers can meet their information needs by giving personalized reviews. Also, the use of a specialized search engine only for the review information set can be useful for consumers to collect what they want. Third, online sellers can present the qualitative summary information as well as the quantitative summary information. If online sellers organize the review contents by product attributes or pros/cons, and deliver this organized review summary with the qualitative statistics such as average star-rating scores, consumers are less likely to experience eWOM overload.

Finally, we show the moderating role of consumer involvement on the WOM processing. Since involvement is related to the motivation of information processing, high-involvement consumers are willing to elaborate process the focal messages to get additional product information from online consumer reviews rather than use them as a signal of product popularity. In contrast, low-involvement consumers are not likely to elaborate engage in message-processing, therefore rely on them as a simple sign of product popularity. The results indicate that low-involvement consumers consider the recommender role as being more important than the informant role, but high-involvement consumers consider the informant role as being more important than the recommender role. Thus, the tradeoff between the informant role and the recommender role is resolved from these relations. For low-involvement consumers, an increase in the perceived popularity dominates a decrease in the perceived informativeness of reviews. On the other hand, for high-involvement consumers, a decrease in the perceived informativeness of reviews dominates an increase in the perceived popularity. Hence, when information overload occurs, the purchasing intention of low-involvement consumers increases while that of high-involvement consumers decreases.

There are some limitations to this study. First, this study focuses only on overall positive reviews. There are three reasons that we investigate only positive reviews. First, the inclusion of negative reviews creates many confounding issues such as negativity, credibility of review sources, or two-side effects. The research method of this study is an experimental method. It is quite hard to find a relationship among 4 or 5 variables. So, we controlled other variables except the number of reviews, the type of reviews, and consumer involvement. Second, in reality, there are a few negative reviews. Dellarcas and Narayan [12] reported that 99.1% of customer feedback on eBay is positive, followed by negative (0.6%) and neutral (0.3%). Chevalier and Mayzlin [9], who investigated the effect of consumer reviews on sales of books at Amazon.com and Barnesandnoble.com, also reported that reviews are overwhelmingly positive at both sites. These studies can support our research scope. In addition, positive WOM and negative WOM have been studied separately in most studies on word-of-mouth. Finally, this study tries to address the main research question: “What happens if there are many positive reviews?” It is natural that the increase in the number of positive reviews (messages of positive WOM) has a positive effect on consumer evaluation of a product. This study argues “this natural state” cannot be true in a certain case, where information overload occurs.

Consumers may focus on the qualitative comments of negative comments and the quantitative summary of positive comments. This study and other studies on online consumer reviews report that the qualitative comments also affect consumer behavioral intention by showing the effect of review quality or review length [9,27]. However, we agree that consumers are more likely to focus on the qualitative aspect for negative reviews and the quantitative aspect for positive reviews. This issue can be a good research topic.
There is another issue for future research in terms of the credibility of reviews. Online consumer reviews are created by unknown former purchasers, so consumers can wonder whether reviews are true or not. When consumers read overall positive reviews, such doubt may be stronger because, as you pointed, consumers can worry that companies remove negative reviews or only list the most positive ones. However, we think that such doubt can become weaker as the number of reviews increases. That is, consumers are more worried about whether the reviews are true or manipulated or not when there are a few positive reviews only, rather than there are many positive reviews.

Moore and Reardon [25] showed that multiple product endorsers presenting strong supporting arguments enhance the persuasiveness of advertising appeal. In a hypothetical jury trial, for example, Calder et al. [6] demonstrated that participants generate more thoughts in favor of the defense (prosecution) after they were exposed to a greater number of defense (prosecution) arguments. Harkins and Petty [15] also showed that multiple sources with different backgrounds enhance the persuasiveness of arguments. These studies can support that the number of reviews each created by an individual consumer enhances the persuasiveness of reviews, even when reviews are overall positive. The increase in the persuasiveness of the reviews continues to increase the perceived popularity of a product, too. The effects of online consumer reviews can be generalized through these further studies.

Acknowledgements

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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>General Attitude toward Reviews</th>
<th>(1) When I buy a product online, I always read reviews that are presented on the website.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(2) When I buy a product online, the reviews presented on the website are helpful for my decision making.</td>
</tr>
<tr>
<td></td>
<td>(3) When I buy a product online, the reviews presented on the website make me confident in purchasing the product.</td>
</tr>
<tr>
<td></td>
<td>(4) If I don’t read the reviews presented on the website when I buy a product online, I worry about my decision.</td>
</tr>
<tr>
<td>The Type of Reviews</td>
<td>(1) Each review has sufficient reasons supporting the opinions. Each review is (2) objective/(3) product-relevant/(4) rational.</td>
</tr>
<tr>
<td></td>
<td>(5) Each review has attribute-value information.</td>
</tr>
<tr>
<td>The Number of Reviews</td>
<td>(1) The number of reviews is large.</td>
</tr>
<tr>
<td></td>
<td>(2) The quantity of review information is great.</td>
</tr>
<tr>
<td>Review Positiveness</td>
<td>(1) The reviewers in the given page positively evaluate the product.</td>
</tr>
<tr>
<td></td>
<td>(2) In general, the reviewers in the given page recommend the product.</td>
</tr>
<tr>
<td>Product Advertisement</td>
<td>The product information is (1) objective/(2) understandable/(3) credible/(4) clear.</td>
</tr>
</tbody>
</table>

References


