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An Investigation of Potency of eWOM Messages with a Focus on Subjective Rank Expressions

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***Abstract*—Electronic word-of-mouth (eWOM) is one important information source that influences consumers' product evaluations. This paper presents (1) hypotheses for the potency of eWOM messages with a focus on *subjective rank expressions*, which refer to linguistic representations related to the level of subjective evaluations and the strength of recommendations, and (2) the results of hypothesis testing on the dataset collected from a questionnaire survey administered to one hundred and fifty two undergraduate students. Two expression types of subjective rank expressions - *comparison* and *degree* - were examined. A two-way ANOVA was performed to test the effects of two independent variables "evaluation skill" (SKILL) and "expression type" (TYPE) on the dependent variable "degree of positive change in the evaluations" (POTENCY). The results provide some pieces of evidence in support of the hypotheses. The findings obtained through the research are discussed from a viewpoint of developing accurate methods for the potency prediction of eWOM messages.**

***Keywords*-consumer behavior; electronic word-of-mouth; ewom; linguistic representation; evaluation skill; cognitive fit**

I. INTRODUCTION

In recent years, there has been a focus on electronic word-of-mouth (eWOM) as the information source that influences consumers' product evaluations [1], [2], [3]. eWOM messages refer to statements that are posted electronically in social media such as bulletin boards on the Web. The content includes other consumers' product evaluations and recommendations based on their own experiences and preferences. What kinds of eWOM messages have large potency on the product evaluations made by the consumer who is exposed to the messages? If we can predict the potency on an individual basis, then it will be possible to create an intelligent agent to selectively provide effective statements to individual consumers from among the huge volumes of diverse eWOM messages on the Web. These kinds of intelligent agents would increase opportunities to use eWOM messages and could be expected to promote interactions between consumers via the Web.

Research on word-of-mouth messages, which are communicated verbally with each other, has been conducted for many years from the perspective of differences in the potency of positive and negative information [4] and of the relationship with the attitudes already held by consumers before their contact with the messages [5]. Recently, extensive research has been conducted on eWOM messages, with a particular focus on discussions regarding more detailed aspects of the information content. For example, Park et al. divided eWOM messages on product attributes into two types, which are "attribute-centric" and "benefit-centric," and verified the differences in the potency of these two types [3]. Lee et al. introduced a differentiation between objective attributes such as size and weight and subjective attributes such as color and shape [1].

In order to obtain more accurate personalized prediction of the potency of eWOM messages, further investigations are required. One of such investigations is about the differences in the potency of *subjective rank expressions* used to describe eWOM messages. Here, "subjective rank expressions" refer to linguistic representations related to the level of subjective evaluations and the strength of recommendations. People use comparison and degree type expressions to describe such as "A is easier to use than B" and "A is incredibly beautiful." By shedding light on the representations of eWOM messages, the accuracy in the potency prediction may be improved. Thus, I focus on the differences in potency based on the content of eWOM messages and specifically on the subjective rank expressions.

This research examined two types of subjective rank expressions - "comparison" and "degree" - which are often used in research fields of subjective probabilities [6], [7], [8]. This paper presents (1) hypotheses for the potency of eWOM messages with a focus on the subjective rank expressions and (2) the results of hypothesis testing on the dataset collected from a questionnaire survey administered to one hundred and fifty two undergraduate students. The findings are discussed from a viewpoint of developing accurate methods for the potency prediction of eWOM messages.

For the questionnaire survey, fictitious eWOM messages supporting six product attributes of a digital camera were created, dividing expressions into comparison and degree. The degree of positive changes in evaluations of product attributes was investigated by presenting these two expression types of messages sequentially to the subjects as a

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piece of information posted on a social medium by another consumer. In the case of products like digital cameras, with complex specifications, consumers often refer to the opinions of others [9], so it is possible to investigate the potency of eWOM messages with a high level of sensitivity.

In the following sections, Section II explains the ideas of subjective rank expressions as well as the related message types in the previous researches. Two hypotheses on the subjective rank expressions are developed in the section. Section III describes the experimental procedure conducted with the questionnaire survey in detail. Section IV explains the variables and dataset used in the analyses and presents the results of a two-way analysis of variance (ANOVA) to verify the hypotheses. Section V discusses the future work on the potency of subjective rank expressions of eWOM messages.

II. Theoretical Background and Hypotheses

The idea of subjective rank expressions is shown in Figure 1, including similar content from previous researches. Proposals for types up to now have included differentiation of contents by product attributes and their benefits [3] and subjective vs. objective differentiation of product attributes [1]. In this research, eWOM messages were seen as information based on personal experiences and preferences, so rather than looking directly at attributes, for which information originates with the makers, I focused on the attributes' benefits, which are more important in terms of the consumers' preferences and experiences. Regarding the benefits, this research examined two types of subjective rank expressions: comparison and degree, where the former describes the results of comparisons with other benefits and the latter directly describes the rank of benefits using adjectives and adverbs. Comparative expressions like "A is easier to use than B" are categorized as the comparison type while expressions that emphasize benefit using words like "incredibly" and "super" are categorized as the degree type.

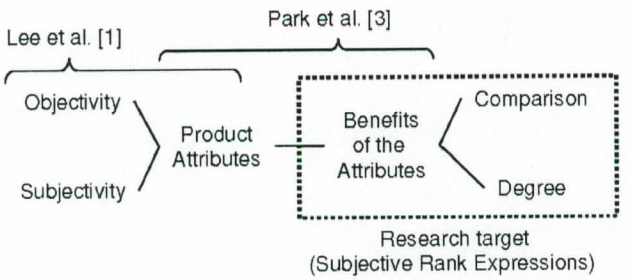

Figure 1. Research target

Differences in the potency of eWOM messages are dependent on the consumers' degree of knowledge and experiences in evaluating the products [3], [10]. One theory explaining these effects is the cognitive fit theory [11]. This theory states that when the expression form taken by information is suited to the degree of the individual's problem-solving skills, the cognitive processing of that information will be more efficient and effective. For example, an expert with the ability to determine benefits based on product attributes prefers "attribute" information, while novices who only understand the merits when the benefits are communicated directly prefer "benefit" information [3]. In other words, information that leaves room for individual evaluations is more effective for experts while information in which the evaluation is already completed by the provider is more effective for novices.

From the perspective of the cognitive fit theory, in the task of rating product attributes, the differences in the potency of comparison and degree type could be seen as follows. Experts prefer "comparison" expressions that leave room for personal determination of the rank, as opposed to "degree" expressions in which the rank has already been determined by the information provider. On the other hand, novices prefer "degree" expressions in which the rank is directly communicated by the information provider, as opposed to "comparison" expressions, which make it difficult for that person to determine the rank. We can thus think that for experts, the potency of the comparison type is greater than the potency of the degree type, and conversely, in the case of novices, the potency of the degree type is greater than the potency of the comparison type. Thus, the following hypotheses are proposed.

Hypothesis A: For consumers with high expertise, comparison type eWOM messages on benefits of a product attribute has greater potency on the evaluation of the product attribute than degree type eWOM.

Hypothesis B: For consumers with low expertise, degree type eWOM messages on benefits of a product attribute has greater potency on the evaluation of the product attribute than comparison type eWOM.

To verify these hypotheses, this paper introduces a factor "evaluation skill," which refers to having/not having an experience for purchasing digital cameras, as the factor indicating the consumer expertise in the product evaluations.

III. Research Method and Design

In this experiment, one hundred and fifty two undergraduate students participated voluntarily. The survey was conducted in the form of a questionnaire on product evaluation tasks, which were for virtually purchasing one of two digital cameras with respect to six product attributes. This section describes the experiment procedure in detail.

A. Experimental Products

Two hot-selling digital cameras were chosen according to the hot-selling ranking service provided by kakaku.com,

which is a famous price comparison site in Japan. The prices of these digital cameras were both nearly $200 and they had about the same release date. The brand names as well as the product names were not presented to prevent any brand effects.

B. Experimental Product Attributes

These six product attributes were extracted: (a) image quality (image processing engine), (b) image quality (optical zoom), (c) utility (specific utility), (d) utility (image utility), (e) LCD monitor, (f) design. The product attributes were selected with the condition that they appeared in characteristics sections of both press releases for the products, obtained from the makers' websites. Characteristics of the product attributes for both products were extracted from the characteristics sections of the press releases. For example, "7.1x Optical zoom" and "5x Optical zoom" were the characteristics for (b) image quality (optical zoom) of the products, respectively. The questionnaire involved the characteristics of six product attributes of two products as the product information.

C. Experimental eWOM Messages

Twelve fictitious eWOM messages used in the experiment are shown in Figure 2. Alphabets (a)-(f) in the figure correspond to the alphabets for product attributes in Section III B. As shown in the figure, the eWOM messages consisted of comparison type and degree type, each which had six eWOM messages for the product attributes. One of two products is called *target product* and the attributes of the target product were referred positively in eWOM messages. The other one is called *comparative product* and the attributes of the comparative product were referred only for the comparison with the target product in comparison type messages. Each eWOM message described positive evaluation for a product attribute of the target product. Thus, the degree of positive changes was measured in terms of evaluations for the product attributes of the target product.

D. Experimental Procedure

A booklet for the questionnaire was given out to subjects. The booklet was the same for all subjects. Subjects answered questions by filling in answer cells for machine-scoring in this booklet. A brochure for presenting eWOM messages was also given out to subjects. Each page of the brochure contained one of the expression types of eWOM messages for six product attributes (See Figure 2). The page sequence of comparison and degree type of the eWOM messages was randomized by the brochures, therefore, by the subjects.

Subjects read the first page of the booklet for the questionnaire, which was a statement about the study's purpose with brief guidance on the experiment. Then, respondents went forwards as follows.

Comparison type

(a) Smooth Imaging Engine III is more beautiful than Venus Engine IV.
(b) 7.1x optical zoom is more beautiful than 5x optical zoom.
(c) The macro photography functions are easer to use than the HD Movie Recording functions.
(d) The image flag function for quick display is more convenient than the slideshow function with music.
(e) The 3.0-inch 460,000-dot LCD monitor is more convenient for viewing images than the 2.5-inch 230,000-dot High-resolution LCD.
(f) The solid, metal feel is much more stylish than the distinctive surface finish for each different body color.

Degree type

(a) Smooth Imaging Engine III is incredibly beautiful.
(b) 7.1x optical zoom provides super beautiful images.
(c) The macro photography functions are super easy to use.
(d) The image flag function for quick display is enormously convenient.
(e) The 3.0-inch 460,000-dot LCD monitor is super convenient for viewing.
(f) The solid, metal feel is absolutely cool.

Figure 2. Experimental eWOM messages. (Original messages were written in Japanese.)

1) Subjects were asked to answer their gender, age and the other demographic information as well as the skills in evaluating digital cameras. The evaluation skill was obtained with a question whether the subject has or does not have an experience in purchasing digital cameras for him/herself.
2) Prior to their contact with the eWOM messages, subjects were asked to rate each attribute of the target product with the product information as their initial attitude towards the attributes. Each attribute of the comparative product was also asked to rate. These evaluation processes of two products helped the subjects make the initial preference on them comparatively.
3) Subjects were asked to rate the evaluation change for each product attribute of the target product in sequence with the eWOM messages, which were presented in the brochure as a piece of information posted on a social medium by another consumer. Likert scales with five-point items was used to measure the response for the statement "The attractiveness of the attribute increased positively with the eWOM message." The five-point items were strongly disagree (1 point), disagree (2 point), neither agree nor disagree (3 point), agree (4 point), and strongly agree (5 point).

A note was inserted between 1) and 2) of the booklets as

follows: "The prices of these digital cameras are both nearly $200 and they have about the same release date. Do not use your previous knowledge for brands of digital cameras even if you find the brands and/or product types."

IV. Research Results

A two-way ANOVA was performed to test the interaction effects of the independent variables "evaluation skill" (SKILL) and "expression type" (TYPE) on the dependent variable "degree of positive changes in the evaluations" (POTENCY). This section describes the research results as well as the variables and dataset used in the analyses. SPSS Advanced Statistics version 17.0 was used for the analyses.

A. Variables and Dataset

The dependent variable POTENCY refers to the degree of the positive change in the attribute evaluations of target product by presenting eWOM messages. The measure used for the variable was the five-point Likert scale (See Section III. *D*. 3), so that the range of POTENCY is from 1 to 5. The independent variable SKILL refers to the skills in evaluating digital cameras and takes "experienced" or "inexperienced", which related to the subject's experiences in purchasing digital cameras (See Section III. *D*. 1). The independent variable TYPE refers to the expression type of eWOM messages and takes "comparison" or "degree", which means the type of presented eWOM message. SKILL and TYPE were used as inter-case and intra-case factor for the ANOVA analyses, respectively.

From the questionnaire survey, one hundred and eighteen valid respondents were obtained with the exception of the respondents that had many blanks and/or data entry errors [1]. The characteristics of the valid respondents are as follows. The average age was 20.4 years and 53.0% were male. Many respondents (67.8%) had experiences in online shopping, not limited to digital cameras.

Every respondent answered twelve cases corresponding to the number of presented eWOM messages (See Figure 2). As a result, 1410 cases (118 respondents × 12 messages − 6 exceptions with any missing value for the variables) were obtained and were used as the dataset for the analyses. Table I shows details of the mean values of the dependent variable and the other descriptive statistics of each group.

B. Results

The results of ANOVA showed that there was a significant interaction effect between SKILL and TYPE ($F(1, 703) = 32.92$, $p < .001$). The presence of the interaction effects is also clearly demonstrated in Figure 3, which shows the mean of the dependent variable for each group. A Bonferroni multiple comparison test was also performed following the analysis. Table II shows all pairs that were detected a significant difference by the multiple comparison. The notation (x, y) in the table represents the group where SKILL = x and TYPE = y. This table shows that the results provide supports for both Hypothesis A and B as described below.

1) The significant difference was detected between (exp., comparison) and (exp., degree), $p < .001$. This suggests that comparison type eWOM messages have greater potency than degree type ones for consumers skilled in evaluating digital cameras. This supports Hypothesis A.
2) The significant difference was detected between (inexp., degree) and (inexp., comparison), $p < .01$. This suggests that degree type eWOM messages have greater potency than comparison type ones for consumers who have a shortage of the skills in evaluating digital cameras. This supports Hypothesis B.
3) The significant differences were also detected between (exp., comparison) and (inexp., comparison), $p < .05$, and between (inexp., degree) and (exp., degree), $p < .001$. These suggest that comparison type eWOM messages have greater potency for skilled consumers than for consumers who have the shortage and that degree type eWOM messages have greater potency for consumers who have the shortage than for skilled consumers. These also support Hypothesis A and B.

Table I
Descriptive Statistics

Evaluation Skill	Experienced		Inexperienced	
Expression Type	Com.	Deg.	Com.	Deg.
Mean	3.50	3.01	3.27	3.53
Standard Deviation	1.33	1.36	1.35	1.25
Size	328	328	377	377

(Com. = Comparison Type, Deg. = Degree Type)

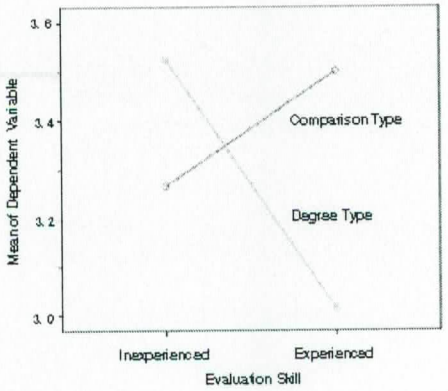

Figure 3. The interaction effect of expression type × evaluation skill.

[1] The valid respondents excluded some subjects because of their error or deficit in transcription of the sequence code, which was written in the brochure and indicated the page sequence of two expression types, to the questionnaire booklet.

Table II
RESULTS OF MULTIPLE COMPARISONS

Pairs of groups		Differences between mean values (I-J)
Group I	Group J	
(exp., comparison)	(exp., degree)	.49***
(inexp., degree)	(inexp., comparison)	.26**
(exp., comparison)	(inexp., comparison)	.24*
(inexp., degree)	(exp., degree)	.51***

* $p < .05$, ** $p < .01$, *** $p < .001$
(exp. = experienced, inexp. = inexperienced.)

The results suggest that the potency prediction of eWOM messages becomes more accurate by using the idea of subjective rank expressions. They also suggest that not only "expressions" of each message but also "skill" of each receiver is required to be introduced in order to obtain accurate prediction with the idea of subjective rank expressions. More specifically, the potency prediction is expected to become more accurate when it predicts the potency of comparison type eWOM messages higher level than the potency of degree type for consumers with high expertise and, conversely, when it predicts the potency of degree type eWOM messages higher level than the potency of comparison type for consumers with low expertise.

V. FUTURE WORK

In this paper, evaluation skill was measured with respect to having/not having an experience for purchasing digital cameras. However, it is not guaranteed that the persons are well skilled in the product evaluations just because they have purchased in the past. Another viewpoint for determining the evaluation skill should be introduced to confirm the findings obtained through the paper. I think the product knowledge the persons have is one important factor to determine the evaluation skill and should be introduced.

Many other factors of eWOM messages have to be taken into consideration in order to develop the potency prediction because people use various types of messages in eWOM communication. Other factors include categorizations described in Section II [1], [3] and categorizations based on *search* and *experience* [12]. They also include message types that state the brands positively or negatively [13] although this paper focused only on content related to support of product attributes. The credibility of eWOM messages [14] may have a decisive influence on the potency. The combination of these factors will really determine the potency of the messages, so that these factors should be used properly for the practical prediction methods.

The potency related to purchase intentions is also one important viewpoint to be considered. Purchase intentions refer to product evaluations in terms not of like/dislike but of willing to buy/not willing to buy, so that they are useful to know consumer behavior in detail. In the prediction of the potency related to purchase intentions, other factors come into play, including the degree to which the consumers give added weight to each product attribute [15] and more complex effects will no doubt become apparent.

It will be necessary to conduct tests using many product categories and many consumer segments in order to obtain more general knowledge about the potency of subjective rank expressions.

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