

**Impacts of the Ratio and Order of  
Positive and Negative Electric Word-of-mouth on a Single Website**

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# **Impacts of the Ratio and Order of Positive and Negative Electric Word-of-mouth on a Single Website**

## **ABSTRACT**

Most research has shown that positive electric word-of-mouth (e-WOM) has positive effects, while negative e-WOM has negative effects on consumer attitudes towards a product. However, negative e-WOM may have positive impacts rather than negative impacts. Using ANOVA in three experiments, the present study found that negative e-WOM can have a positive impact on consumer attitudes under some conditions, including when the e-WOM is in regard to hedonic products, when expert consumers read attribute-centric reviews, and/or when negative e-WOM occurs before much positive e-WOM.

*Keywords: the ratio of positive to negative e-WOM; hedonic products; expert consumers; attribute-centric reviews; the order of positive and negative e-WOM*

## **INTRODUCTION**

With the advent of the Internet in Japan, European Union, and other developed countries, electronic word-of-mouth (e-WOM) consumer reviews, have come into

vogue (Bickart and Schindler 2001; Godes and Mayzlin 2004). WOM is defined as a form of person-to-person communication between a receiver and a communicator, which the receiver perceives as non-commercial, concerning a brand, product, or service for sale (Arndt 1967); e-WOM is a less personal but now more ubiquitous form of WOM. Today, the effects of e-WOM cannot be ignored in the formation of consumer attitudes towards a product. Rather, it is necessary for businesses to understand how e-WOM affects consumer attitudes towards their products.

Most research has shown that positive e-WOM has positive effects, while negative e-WOM has negative effects on consumer attitudes (Herr, Kardes, and Kim 1991; Luo 2009). Additionally, it has been suggested that people tend to weigh negative reviews more than positive ones; negative e-WOM has a stronger, negative impact than positive e-WOM (Herr, Kardes, and Kim 1991; Ahluwalia and Shiv 1997). These studies have assumed that consumers form their attitudes through referring to either positive or negative e-WOM. However, when consumers simultaneously refer to both positive and negative e-WOM reviews on a single website, negative e-WOM may have a positive impact. For example, Doh and Hwang (2009) found that consumer attitudes towards a product was higher when the ratio of positive to negative e-WOM was 8:2 than when

the ratio was 10:0. This indicates that the existence of some negative e-WOM improved consumer attitudes.

The present study addresses the limitations of Doh and Hwang's study and expands on it by specifically assessing consumer attitudes changes in relation to different ratios of positive to negative e-WOM (10:0, 8:2, 6:4), different types of product (hedonic vs. utilitarian products), different levels of expertise (expert vs. novice consumers), different types of reviews (attribute-centric vs. benefit-centric reviews), and different orders of positive and negative e-WOM (negative e-WOM preceding positive e-WOM and vice-versa).

## **LITERATURE REVIEW AND HYPOTHESES**

### ***Negative effects of negative e-WOM***

Much previous research has claimed that positive WOM has positive effects, while negative WOM has negative effects on consumer attitudes towards a product (e.g. Richins 1983; Herr, et al. 1991; File and Prince 1992; Laczniak, et al. 2001; Xueming 2009). In e-WOM research studies, Park and Lee (2009), for example, examined the effects of the type of product (search vs. experience goods), the direction of e-WOM (positive vs. negative e-WOM), and the reputation of the website (established vs.

unestablished website). Their results showed the positive WOM had positive effects, while negative WOM had negative effects.

### ***Positive effects of negative e-WOM***

Unlike traditional WOM, both positive and negative e-WOM is typically presented to consumers on a single website. Doh and Hwang (2009) assumed that consumers exposed to many e-WOM messages simultaneously at positive to negative e-WOM ratios of 10:0, 9:1, 8:2, 7:3, and 6:4. They found that purchasing intention and attitudes towards the product were highest when the ratio was 10:0, while credibility of the e-WOM messages and attitudes towards the website were highest when the ratios were 9:1 and 8:2, respectively. This indicates that the existence of negative e-WOM had a positive impact on some aspects of consumer behavior.

Hiura, et al. (2010) also investigated the positive impacts of negative e-WOM. They found that attitudes towards a product were the highest when the ratio was 8:2, not 10:0 under particular conditions, and concluded that characteristics of consumers, reviews, and products determine whether negative e-WOM affects consumer attitudes negatively or positively.

### *Moderating effects of product characteristics*

Sen and Lerman (2007) investigated the negative effects of e-WOM for hedonic versus utilitarian products on the basis of the affect confirmation hypothesis (Adaval 2001). Hedonic products are primarily characterized by an affective and sensory experience of aesthetic or sensual pleasure, fantasy, and fun (Hirshman and Holbrook 1982). In contrast, utilitarian products are measured as a function of the products' tangible attribute (Drolet, Simonson, and Tversky 2000). According to the affect confirmation hypothesis, persons who base their product judgment on hedonic criteria give greater weight to attribute information when the information is consistent with their mood than when it is inconsistent with their mood. In contrast, this should not be the case, when reading reviews for utilitarian products. Consumers are likely to be in a positive mood when reading reviews for a hedonic product, basically because they are looking forward to choosing a product that will make them feel good. As a result, they may discount negative reviews of the product because they are inconsistent with their current mood. Thus, in the case of hedonic products, negative effects of negative e-WOM are extinguished.

Similarly, Ellis (1973) claimed that people seek optimal stimuli, that they feel most comfortable when exposed to moderate stimuli, called "optimal arousal." Assuming that

negative measures can be seen as stimulation for consumers processing information in making purchase decisions, they may regard a lower ratio of positive to negative messages than 10:0 as an optimal stimulation. If so, consumer attitudes may be higher when there is at least some negative e-WOM. Thus, we proposed the following hypothesis:

H1: Consumer attitudes towards a hedonic product are higher when there is at least some negative e-WOM.

### ***Moderating effects of consumer and review characteristics***

Park and Kim (2008) focused on the roles of both consumer and review characteristics and inquired how the level of expertise and the type of reviews influenced the effects of e-WOM on consumer attitudes. The level of expertise involves consumer motivation and the ability to process detailed information. Experts have both, while novices have either or neither. Reviews can be attribute-centric or benefit-centric. Park and Kim showed that attribute-centric reviews had stronger effects on experts than did benefit-centric reviews, whereas the latter had a stronger effect on novices.

Similarly, Sussman and Siegal (2003) suggested that consumers with low expertise weigh source credibility more than argument quality, while consumers with high expertise weigh argument quality more than source credibility. According to Cheung, Lee, and Rabjohn (2008), information comprehensiveness containing both positive and negative sides has the strongest impact on information usefulness in all components of argument quality. For expert consumers, attribute-centric reviews with some negative WOM have a stronger impact on their attitudes towards the product than the reviews with no negative WOM. Thus, we hypothesize the following hypothesis:

H2: In the case of experts reading attribute-centric reviews, consumer attitudes towards a product is higher when there is at least some negative e-WOM.

### ***Moderating effects of the order of the messages***

According to the recency effect (Broadbent, Vines, and Broadbent 1978), the effects of a review acquired recently are stronger than those acquired previously. Pathak, et al. (2010) found that the recency of recommendation messages significantly moderated the impact of positive messages on the sales of a product in an online store when anxiety

for purchasing the product and information processing costs were higher. This indicates that recent e-WOM has a stronger impact on consumer behavior than older e-WOM.

Thus, the negative effects of negative e-WOM on consumer attitudes towards a product might be diminished if the e-WOM review is followed by a series of positive e-WOM reviews. We investigated this phenomena in two conditions under which negative e-WOM has a positive impact on consumer attitudes. We formulated the following two hypotheses:

H3: Consumer attitudes towards a hedonic product is higher when there is more negative e-WOM at the top of the website than at the bottom.

H4: In the case of experts reading attribute-centric reviews, consumer attitudes towards a product is higher when there is some negative e-WOM at the top of the website rather than at the bottom.

## **METHODS AND RESULTS**

### ***Study 1: Moderating effects of product, review, and consumer characteristics***

To test these hypotheses, we conducted three laboratory experiments that investigated how consumer attitudes towards a product varied with the type of product (hedonic vs. utilitarian products), receiver (expert vs. novice consumers), the type of review (attribute-centric vs. benefit-centric reviews), and the order of positive and negative e-WOM (negative e-WOM preceding positive e-WOM and vice-versa) when the ratios of positive to negative e-WOM were 10:0, 8:2, and 6:4.

In Study 1, we tested H1 and H2 empirically using an experiment with virtual internet forums with different ratios of positive and negative e-WOM messages, which were either attribute-centric or benefit-centric reviews about one of four products—movies and comics as hedonic products and a portable music player and digital camera as utilitarian products. The orders of the positive and negative e-WOM in the virtual forums were random. In total, 201 undergraduate students in a business school in Tokyo participated in the experiment; they were highly involved with the products, but had different levels of expertise regarding the products: Some students were expert consumers, while others were novices. They were asked to browse a series of e-WOM messages in a particular virtual forum regarding one of the four products, and then to answer questions regarding their own evaluation of the product.

Insert Table 1 and Figure 1 about here

An analysis of variance (ANOVA) was conducted. The main effects of the ratio of positive to negative e-WOM (10:0, 8:2, 6:4) were significant ( $F = 192.66, p < 0.01$ ), as were the interactions between the ratio and the type of product (hedonic vs. utilitarian) ( $F = 6.13, p < 0.01$ ). As summarized in Table 1 and Figure 1, consumer attitudes towards hedonic products were highest when there was some negative e-WOM. The mean levels of consumer attitudes towards the movie were 4.72 (SD = 1.04), 5.50 (SD = 0.81), and 2.57 (SD = 1.31) when the ratios of positive to negative e-WOM were 10:0, 8:2, and 6:4, respectively. Those towards the comic were 4.60 (SD = 1.05), 5.44 (SD = 0.90), and 3.01 (SD = 1.00), respectively. In contrast, consumer attitudes were highest when there was no negative e-WOM. The mean levels of consumer attitudes towards the portable music player were 5.64 (SD = 0.55), 4.71 (SD = 0.95), and 2.84 (SD = 1.03), respectively. Those towards the digital camera were 5.64 (SD = 0.55), 4.71 (SD = 0.95), and 2.84 (SD = 1.03), respectively. These results empirically support H1.

Insert Table 2 and Figure 2 about here

Interactions among the ratio of positive to negative e-WOM, the level of expertise (expert vs. novice consumers), and the type of review (attribute-centric vs. benefit-centric) were also significant ( $F = 3.88, p < 0.01$ ). As summarized in Table 2 and Figure 2, consumer attitudes towards a product were highest when there was some

negative e-WOM if and only if the consumer was an expert and the e-WOM was attribute-centric. The mean levels of attitudes of expert consumers reading attribute-centric reviews were 4.99 (SD = 0.82), 5.71 (SD = 0.68), and 2.42 (SD = 1.15) when the ratio of positive to negative e-WOM were 10:0, 8:2, and 6:4, respectively. In contrast, those of novice consumers reading attribute-centric reviews were 5.14 (SD = 1.03), 4.84 (SD = 0.97), and 3.09 (SD = 1.00). The mean levels of attitudes of expert consumers reading benefit-centric reviews were 4.85 (SD = 1.00), 4.99 (SD = 0.78), and 2.85 (SD = 1.21); those of novice consumers reading benefit-centric reviews were 5.56 (SD = 1.03), 4.97 (SD = 0.86), and 2.94 (SD = 0.86). These results empirically support H2.

### ***Study 2: Moderating effects of the order of the messages***

#### ***in the case of e-WOM on hedonic products***

In Study 2, we tested H3 empirically using an experiment with virtual internet forums with different ratios of positive and negative e-WOM messages for movies and comics (hedonic products). Unlike in Study 1, the order of positive and negative e-WOM was varied as follows: negative preceding positive, negative following

positive, and random. In total, 420 undergraduate students in a business school in Tokyo participated in the experiment.

Insert Table 4 and Figure 4 about here

The ANOVA results are summarized in Table 3 and Figure 3. Again, the main effects of the ratio of positive to negative e-WOM (10:0, 8:2, 6:4) were significant ( $F = 287.98$ ,  $p < 0.01$ ). The mean levels of consumer attitudes towards the movies were 4.53 (SD = 1.33), 6.13 (SD = 0.58), and 4.24 (SD = 0.79) when the ratios of positive to negative e-WOM were 10:0, 8:2, and 6:4, respectively. Additionally, the effects of the order of positive and negative e-WOM were also significant ( $F = 22.64$ ,  $p < 0.05$ ). The mean levels of consumer attitudes towards the movie were 3.87 (SD = 1.83), 3.69 (SD = 1.80), and 3.40 (SD = 1.72) when negative e-WOM preceded positive e-WOM. Thus, these results empirically support H3.

### ***Study 3: Moderating effects of the order of the messages***

#### ***in the case of experts reading attribute-centric reviews***

In Study 3, we tested H4 empirically using an experiment with virtual internet forums with different ratios of positive to negative e-WOM messages, that were either attribute-centric or benefit-centric. The same three orders of positive to presented in the

previous study were used. 201 undergraduate students in a business school in Tokyo participated. They had different levels of expertise regarding the products. Some students were expert consumers, while others were novices in choosing the products.

Insert Table 4 and Figure 4 about here

The ANOVA results are summarized in Table 4 and Figure 4. Again, the main effects of the ratio of positive to negative e-WOM (10:0, 8:2, 6:4) were significant ( $F = 56.88$ ,  $p < 0.01$ ). The mean levels of attitudes of expert consumers reading attribute-centric reviews were 4.52 ( $SD = 0.62$ ), 5.02 ( $SD = 0.84$ ), and 3.76 ( $SD = 0.94$ ) when the ratios of positive to negative e-WOM were 10:0, 8:2, and 6:4, respectively. Additionally, the effects of the order of positive and negative e-WOM were also significant ( $F = 12.72$ ,  $p < 0.01$ ). The mean levels of consumer attitudes towards the movie were 4.59 ( $SD = 1.83$ ), 4.62 ( $SD = 1.80$ ), and 4.09 ( $SD = 1.72$ ) when negative e-WOM proceeded positive e-WOM, when the two types were presented randomly, and when negative followed positive. Thus, these results empirically support H4.

## **DISCUSSION**

There has been much discussion about WOM consumer reviews. Most research has shown that positive WOM has positive effects, while negative WOM has negative

effects on consumer behavior. Also, most studies tend to assume that consumers form their attitudes by referring to either positive or negative WOM. In the present study, we assume that consumers refer to both positive and negative e-WOM simultaneously on a single website, and found that negative e-WOM had a positive effect on consumer attitudes regarding hedonic products and/or experts reading attribute-centric reviews. Moreover, negative e-WOM had a greater positive effect when it was at the top of the website as opposed to at the bottom.

### **LIMITATIONS AND FURTHER RESEARCH**

This study has some limitations. First, we assumed that attribute-centric and benefit-centric reviews do not coexist on a single website. Future research should also consider the ratio and the order of attribute-centric to benefit-centric reviews. Second, not only the ratio and order of positive and negative reviews, but also the content and relationships between reviews should be considered. Some negative reviews are posted as counterarguments against previous positive reviews, while others are posted as arguments independent from any previous review. Finally, future studies should consider the impact of the credibility of the information source and the platform where the reviews are posted.

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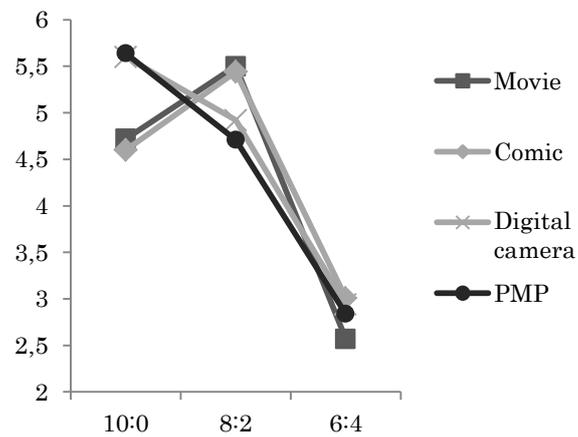
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**Table1. Results of Study I (effects of product type)**

				$X_3$ (ratio of e-WOM)		
				10 : 0	8 : 2	6 : 4
$X_1$ (type of products)	Hedonic Products	Movie	Mean	4.72	5.50	2.57
			(SD)	(1.04)	(0.81)	(1.31)
		Comic	Mean	4.60	5.44	3.01
			(SD)	(1.05)	(0.90)	(1.00)
	Utilitarian Products	Portable Media	Mean	5.64	4.71	2.84
		Player	(SD)	(0.55)	(0.95)	(1.03)
Digital camera		Mean	5.60	4.92	2.94	
		(SD)	(0.77)	(0.64)	(0.94)	

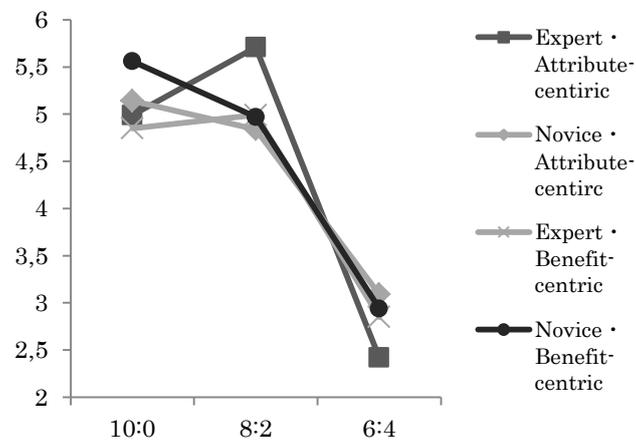
**Figure 1. Summary of the Results of Study I (effects of product type)**



**Table 2. Results of Study I (effects of review type × receiver type)**

$X_4$ (type of receiver)	$X_2$ (type of review)		$X_3$ (ratio of e-WOM)		
			10 : 0	8 : 2	6 : 4
Expert	Attribute-centric	Mean	4.99	5.71	2.42
		(SD)	(0.82)	(0.68)	(1.15)
Novice	Attribute-centric	Mean	5.14	4.84	3.09
		(SD)	(1.03)	(0.97)	(1.00)
Expert	Benefit-centric	Mean	4.85	4.99	2.85
		(SD)	(1.00)	(0.78)	(1.21)
Novice	Benefit-centric	Mean	5.56	4.97	2.94
		(SD)	(1.03)	(0.86)	(0.86)

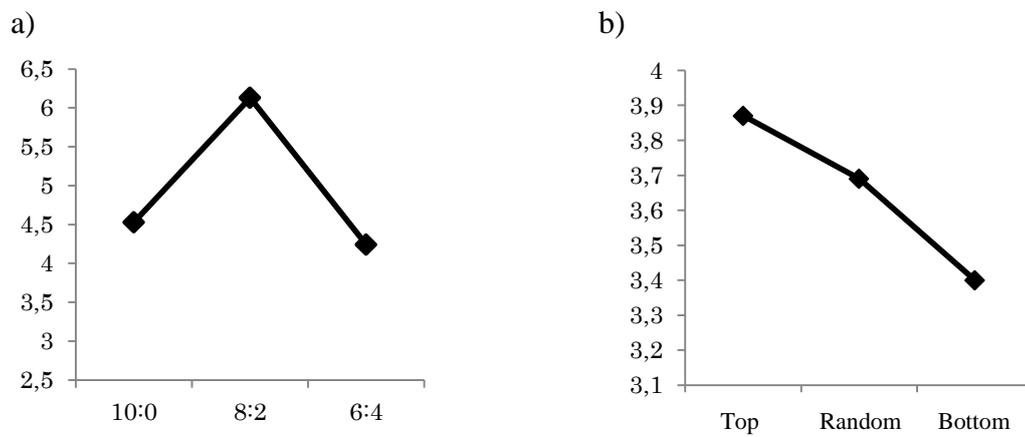
**Figure 2. Summary of the results of Study I (effects of review type × receiver)**



**Table 3. Results of Study 2**

$X_1$ (ratio of e-WOM)	10 : 0	8 : 2	6 : 4
Mean	4.53	6.13	4.24
(SD)	(1.33)	(0.58)	(0.79)
$X_2$ (order of negative e-WOM)	Top	Random	Bottom
Mean	3.87	3.69	3.40
(SD)	(1.83)	(1.80)	(1.72)

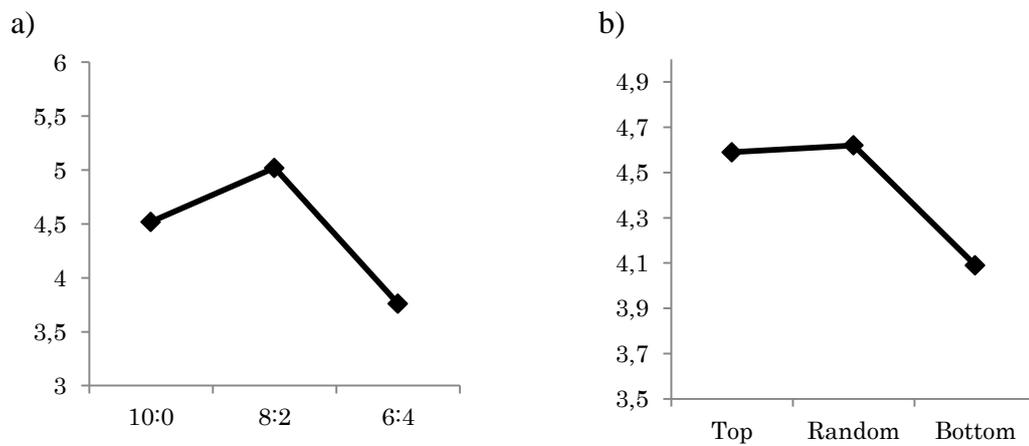
**Figure 3. Summary of the results of Study 2**



**Table 4. Results of Study 3**

$X_1$ (ratio of e-WOM)	10 : 0	8 : 2	6 : 4
Mean	4.52	5.02	3.76
(SD)	(0.62)	(0.84)	(0.94)
$X_2$ (order of negative e-WOM)	Top	Random	Bottom
Mean	4.59	4.62	4.09
(SD)	(1.83)	(1.80)	(1.72)

**Figure 4. Summary of the results of Study 3**



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