

An Investigation of the Presentational Impacts of User-Generated Picture and Text on Consumer Information Processing and Attitude Outcomes in the e-WOM Context

Full Paper

Li Jing

The Hong Kong Polytechnic University
aaron.li@connect.polyu.hk

Xu Xin

The Hong Kong Polytechnic University
xin.xu@polyu.edu.hk

Eric Ngai

The Hong Kong Polytechnic University
mswtngai@polyu.edu.hk

Abstract

Given the importance of e-WOM and the lack of academic research on the role of pictures in influencing consumer decision making, we adapt the cue summation theory to examine the effects of the *relative layout* (the alternate layout vs. the separate layout) and relative sequence (UGP first vs. UGT first) on diagnosticity, pleasantness of e-WOM and customers' attitude towards the recommended product/service in the e-WOM. We conduct an experiment to test our research model. The results show that separate layout is better than the alternate layout in perceived diagnosticity and product evaluation, especially when the UGP is displayed first than the UGT first displayed. In contrast, for pleasantness, alternate layout is better than separate layout, regardless of the sequence of text and picture. These findings make important contributions to e-WOM literature and extend cue-summation theory. Our research also provides guidelines on the presentational strategies of e-WOM.

Keywords

E-Word of Mouth, cue summation theory of multiple-channel communications, layout, sequence.

Introduction

E-Word of Mouth (e-WOM) spreads via social media and comprised of user-generated content (UGC) pervade economies, society, and organizations. E-WOM comes in many forms, including picture, text, and video. While text e-WOM has existed since the first e-mail, the growth of photo and video sharing has been striking on platforms such as Facebook, Instagram and Flickr. For example, Facebook users upload more than 350 million photos each day¹. More interestingly, user-generated pictures (UGP) are significantly different from pictures in the traditional marketing communications such as advertisements and formal product descriptions. Accordingly, we identify three key characteristics of UGP: 1) *Ubiquity*—a huge amount of pictures have diffused into every online review platforms such as Yelp.com and Openrice.com; 2) *Varied Quality*—most of the pictures are taken and posted by users, not by professionals, thus of varied visual quality; 3) *Varied Presentation*—these pictures are presented with text in different layouts—e.g., sometimes intertwined with the main text vs. being separated from the main text, and sequences—e.g., sometimes followed by the main text vs following the main text.

The pervasive use of e-WOM to share photos has significant implications for business, because customers make decisions based on both user-generated text (UGT) and user-generated picture (UGP). In particular, in the context of e-WOM, diners at restaurants take photos of food and facilities and post them to ratings

¹ <http://www.businessinsider.com/facebook-350-million-photos-each-day-2013-9>.

platforms such as Yelp.com or Ricebowl.com. Often, potential diners view UGP more trustworthy than pictures in advertisements, because they are seen as authentic representations of what dishes look like when they appear on the table (Goh et al. 2013). That potential customers view UGP as trustworthy, creates a pressing need research that offers a richer understanding of how UGP influence consumers' decision-making in the context of e-WOM.

While UGP pervade the internet, existing research on e-WOM has been mainly focusing on the impacts of numeric ratings and/or textual content in online customer reviews on business outcomes (e.g., Chevalier & Mayzlin 2006). There are also studies that examine the role of pictorial stimuli in consumer information processing and decision making. For example, some studies emphasize the superiority of pictures (Kim & Lennon 2008). Other studies identify the superiority of the combination of text and picture based on the cue summation theory (Jiang & Benbasat 2007a; Dimoka et al. 2012). However, these studies mainly focus on the standard product/service descriptions and advertisements produced by business rather than e-WOM developed by customers. Then how about the impact of pictures generated by customers on others' information elaboration and downstream decision-making?

We propose that the addition of pictures in e-WOM may not always create instrumental effects, depending on the information presentation (e.g., layout, sequence). That is because the supplement of UGP may create information interference brought by not suitable framing or presentation of UGP and UGT. Then we assert that the additional UGP sometimes inhibits the understanding of the e-WOM, depending on the presentation of UGP relative to UGT. Our research mainly has three objectives: 1) Shed light on the integration impacts of UGT and UGP on consumer information processing and decision making outcomes on ratings platforms; 2) test the proposed model using an experimental study; (3) provide guidance to managers in leveraging UGP to improve the effectiveness of e-WOM.

Drawing on the cue summation theory of multiple-channel communications (Severin 1967), we propose three representative hypotheses on the presentational integration of UGP & UGT on information processing and decision outcomes. In particular, we examine interaction effects of the relative layout (the alternate layout vs. the separate layout) and the relative sequence (UGT first vs. UGP first) on customers' perceived diagnosticity, pleasantness of e-WOM and their attitude towards the recommended product/service in e-WOM. We conduct an experimental study to provide a robust test of our hypotheses. Overall, we mainly find that 1) for perceived diagnosticity, separate layout is better than the alternate layout, especially when the picture is displayed first than the text first; 2) for pleasantness, alternate layout is better than separate layout, regardless of the sequence of text and photo; 3) UGT first presentation does better than UGP first because text acts as a guide in information understanding.

These findings make important contributions. First, current cue-summation theory mainly focuses on two factors—i.e., number of cues and relevancy of cues involved in cue summation (Jiang & Benbasat 2007a; Dimoka et al. 2012). Our research extends cue-summation theory (Severin 1967) by giving a look at the efficiency and ease of cue summation. In addition, our research also extends e-WOM literature (e.g., Godes & Mayzlin 2004) by incorporating the examination of UGP and contributes to the multimedia communication literature (e.g., Kim & Lennon 2008; Dimoka et al. 2012) by providing insights into the relative layout and sequence of UGP to UGT in the e-WOM context.

Literature Review

Till now, there have been substantial studies on the impacts of e-WOM in Information Systems (IS) and Marketing research. Current research has examined how e-WOM influences a wide range of outcomes such as customer awareness, perceptions, attitudes, behavioral intentions, and product sales in a range of contexts, including television shows (Godes & Mayzlin 2004), movies (Dellarocas et al. 2007), books (Chevalier & Mayzlin 2006), beauty products (Moe & Trusov 2011), and restaurants (Godes & Mayzlin 2009). However, these studies have largely focused on textual content and numeric ratings.

While e-WOM research has simply focused on text and ratings, a complementary stream of research suggests that pictorial stimuli have an equally powerful effect on consumer information processing and decision making. Findings suggest that pictorial stimuli have a stronger impact on attitude formation than text (Kim & Lennon 2008), because pictures stimulate the imagination and are more likely to elicit enjoyment from seeing the actual consumption and therefore trigger a desire to consume a product or service. In other words, compared to text, pictures are in principle more attention-getting, easier to

process and understand in a holistic manner, and generating stronger feelings (Peterson and McGee 1974). Recent studies argue that combining picture and text (sometimes referred to as verbal) increases information comprehension (Jiang & Benbasat 2007a; Dimoka et al. 2012).

In summary, existing research mainly examine two forms of e-WOM—i.e., ratings and text, however, the effectiveness of UGP is not well investigated. Further, despite some studies identifying differences in pictorial stimuli and textual stimuli in information comprehension, more insights into the integration of picture and text are needed. Furthermore, rather than UGP, most studies of photos and pictures, focus on professionally produced product/service. Given the identified research gaps, we aim to investigate the integration impacts of UGP and UGT on consumer decision-making outcomes from the presentational perspective—e.g., the relative layout and sequence of UGP to UGT.

Theoretical Background and Hypotheses

In this paper, we draw mainly on the cue summation theory of multiple-channel communications (Severin 1967) to develop our research model and hypotheses. Here, a channel is equivalent to a modality of communication (Grifoni 2009), such as a text channel that consists of textual cues and a picture channel of pictorial cues. The cue summation theory posits that in principle the communication effectiveness depends on the summation of cues from different channels—the more channels involved, the better the communication. This superiority of multi-channel communication has found the support from quite a number of IS studies (e.g., Jiang & Benbasat 2007a & 2007b).

In the current study, we focus on such between-channel interactions in the cue summation process. We point out three premises before developing our research model and hypotheses in this section. First, we follow the premise that compared to text, pictures are in principle more attention-getting, easier to process and understand in a holistic manner, and generating stronger feelings—i.e., the picture superiority effect (Peterson & McGee 1974). Given that pictures facilitate both cognitive understanding and affective feelings, we examine two types of information processing outcomes in the current study—the cognitive outcome (diagnosticity) and the affective outcome (pleasantness). Perceived diagnosticity is defined as the extent to which users believe the overall review is helpful to evaluate products or services (Kempf & Smith 1998). Pleasantness is defined as a positively valence of emotion (Deng & Poole 2010). Second, we focus on e-WOM that consists of multiple paragraphs and pictures—e.g., paragraphs and pictures about the decoration, the taste of food, the service, etc. of a restaurant. Third, we identify two major presentational features—i.e., relative layout and sequence of pictures. The alternate layout groups text and photo by topic while the separate layout puts all the text before the pool of photos. In terms of relative sequence, we focus on two levels—i.e., UGT first with text displayed before the picture while UGP first with picture presented ahead of the text. Finally, we focus on positive e-WOM in our current study though our model can be readily adapted to incorporate the negative e-WOM. Figure 1 depicts our research model.

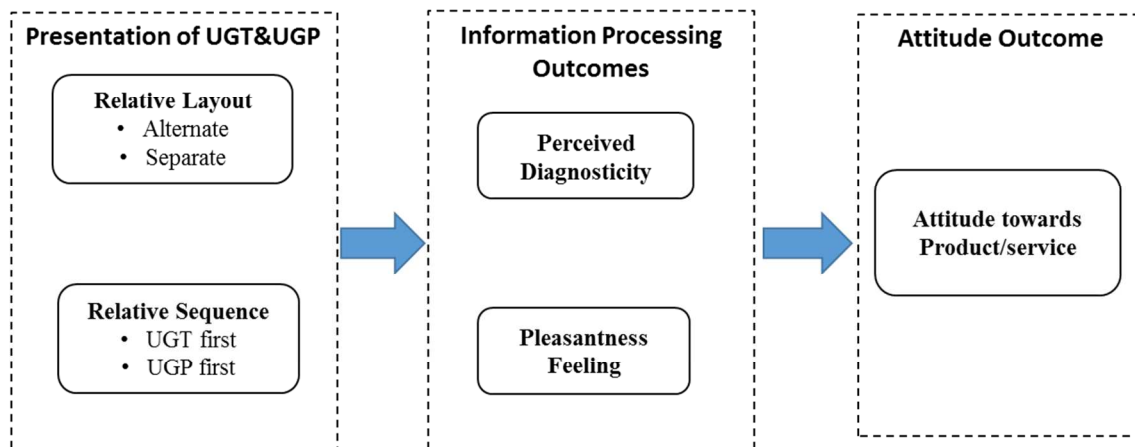


Figure 1. Research Model

Sequence Impact

We posit that that perceived diagnosticity of an e-WOM is mainly influenced by the ambiguity of the e-WOM as a result of the summation of both textual and pictorial cues. This is because perceived diagnosticity depends on whether consumers can have clear information to support their final decisions (Kempf & Smith 1998). While pictures are easier to process and understand, they may contain noise for a consumer without the right framing or guidance of the textual cues, thus decrease the efficiency of cue-summation. Thus, we posit that the presentational sequence of contents between text and picture channels affects cue summation efficiency: in UGT first presentation, text acts as guidance for processing picture(s) and helps develop a clear understanding of the e-WOM while in UGP first presentation, no guidance of text to process picture(s), which hurts the elaboration of the e-WOM. Thus,

H1: E-WOM in UGT-first presentation will be perceived of higher diagnosticity and lead to more favorable attitude towards the product/service than the one in UGP-first presentation.

Layout Impact

We conjecture that the relative layout of UGT and UGP interact to affect perceived diagnosticity of the e-WOM by influencing the efficiency of cue summation. In general texts and pictures can work together to facilitate information processing and comprehension, there can be nonetheless costs brought by the interference between channels to alleviate the efficiency of the overall cue summation.

In the separate layout, all the texts and pictures are clustered in two separate pools, which suggests one time of channel-switching in cue summation process. Especially when all the texts are presented in the beginning, which helps generate a comprehensive map of the product/service before interpreting pictures, customers are more likely to be able to recall what they have read with the reminder of subsequent pictures and thus solidify their understanding. However, in the alternate layout, the textual cues will interfere more frequently with the pictorial cues because consumers need to switch between the text and the picture channels from time to time, which increase costs of channel-switching and decreases the efficiency of cue summation. Thus,

H2: In the UGT-first presentation, the relative layout is not salient; In the UGP-first condition, the e-WOM in the separate layout will yield higher diagnosticity and more favorable attitude towards the product/service than the one in the alternate layout.

In addition, we conjecture that the relative layout of UGT and UGP also interact to affect pleasantness feeling by influencing the ease of cue-summation. Pictorial cues via imagination is likely to elicit enjoyment from seemingly actual consumption and trigger desire for a product or service (Kim & Lennon 2008). We posit that the between-channel interference will also influence the outcome—that is, while pictures are generally more attention-getting and producing enjoyment, the relatively layout may affect the level of pleasantness generated from cue summation.

In the alternate layout, consumers can easily cross-reference the textual cues when processing the pictorial cues and easily establish the connection between text and picture in the cue summation process. As a result, the intertwined textual cues strengthen the imagination of seemingly actual consumption elicited by pictures that vividly represent a product or service. In contrast, the separate layout ‘sum up’ all the pictures in one pool, which creates sort of isolation between text and picture channels, thus reducing the ease of cue summation and finally inhibiting the smooth development of imagination. Thus,

H3: Regardless of the relative sequence, e-WOM in the alternate layout will bring more pleasantness feeling and lead to more favorable attitude towards the product/service than the one in the separate layout.

Method

We tested our hypotheses in an experimental study. This experiment had three main objectives. First, it tested the main effect of layout and sequence on perceived diagnosticity, pleasantness feeling and attitude towards the product/service; Second, it tested the interaction effect of layout and sequence on these outcomes; Finally, we also explored the mechanism behind the hypothesized layout and sequence effects.

Design

We recruited 162 participants (95 female, Mean(age)=22) from Amazon Mechanical Turk. For the detailed sample characteristics (e.g., education, income), please refer to Appendix A. They were randomly assigned to one of 4 conditions in a 2 (Layout: separate vs. alternate) × 2 (Sequence: UGP first vs. UGT first) full factorial between-subjects design.

Procedures and Measures

At the beginning of the experiment, participants first answer two questions on their liking of Japanese food and eating experience in Japanese restaurants. And then they read the instructions and learn that the study is about evaluating a Japanese restaurant based on online customer reviews. The participants will be asked to role-play in the following situation: “Imagine that you want to select a good restaurant for dinner. After searching online, you find the following review about a restaurant”. Subsequently, they were randomly exposed to one of the 4 manipulations as depicted in Appendix C. After reading the review, participants will answer questions about the key variables in our model. Existing scales are adapted for our study. All scales are shown in Appendix B.

Variables	Reliability	Mean	Std.Dev	1	2	3
Attitude	.951	5.370	1.860	1		
Diagnosticity	.593	5.317	1.431	.670**	1	
Pleasantness	.936	5.681	1.193	.076	.523**	1

Table 1. Descriptive Statistics and Correlations

Results

Manipulation check. For the manipulation check of layout, participants were asked to indicate to what extent they agree the photos and text ranging from irrelevant to relevant on a 7-point scale (1=irrelevant, 7=relevant). The one-way ANOVA result indicated that the manipulation of layout was successful ($F(1, 160)=4.794, p<.05$): the participants in the separate condition considered the review more relevant (Mean=5.825) than those in the alternate condition (Mean=5.3415).

Perceived diagnosticity. We conducted a two-way ANOVA and got significant main effect of layout ($F(1, 158)=17.5, p=.000$) and sequence ($F(1, 158)=28.6, p=.000$) on perceived diagnosticity. Besides, we also obtained significant interaction effects between layout and sequence on diagnosticity ($F(1, 158)=37.5, p=.000$). As shown in Figure 2, when UGT first, layout didn't significantly change their diagnosticity ($F(1,158)=1.982, p=.161$). In contrast, when UGP first, separate layout significantly increased participants' perceived diagnosticity (Mean=5.75) than those in the alternate layout condition ($F(1,158)=50.588, p=.000$; Mean=3.85).

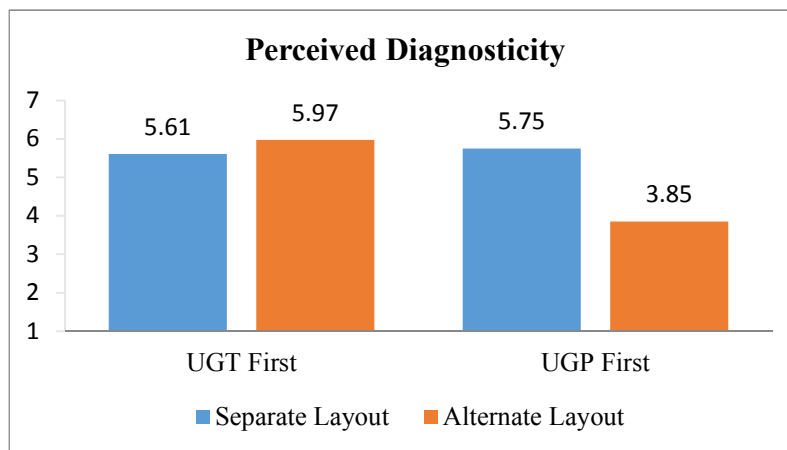


Figure 2. Interaction Impact of Sequence and Layout on Diagnosticity

Pleasantness. We only got significant main effect of layout ($F(1, 158)=5.24, p=.023$). As shown in Figure 3, regardless of sequence, alternate layout significantly increased participants' pleasantness than those in the alternate layout condition.

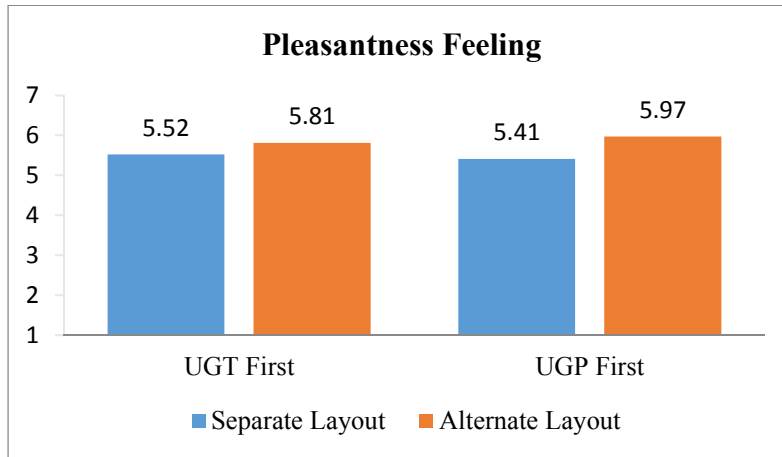


Figure 3. Interaction Impact of Sequence and Layout on Pleasantness

Attitude towards Restaurant. We got significant main effects of layout ($F(1, 158)=68.692, p=.000$) and sequence ($F(1, 158)=96.092, p=.000$) and also obtained significant interaction effects between layout and sequence ($F(1, 158)=92.683, p=.000$) on attitude. As shown in Figure 4, when UGT first, layout didn't have a significant impact ($F(1,158)=.943, p=.333$). In contrast, when UGP first, separate layout significantly increased participants' attitude (Mean=6.08) than those in the alternate layout ($F(1,158)=152.924, p=.000$; Mean=2.79).

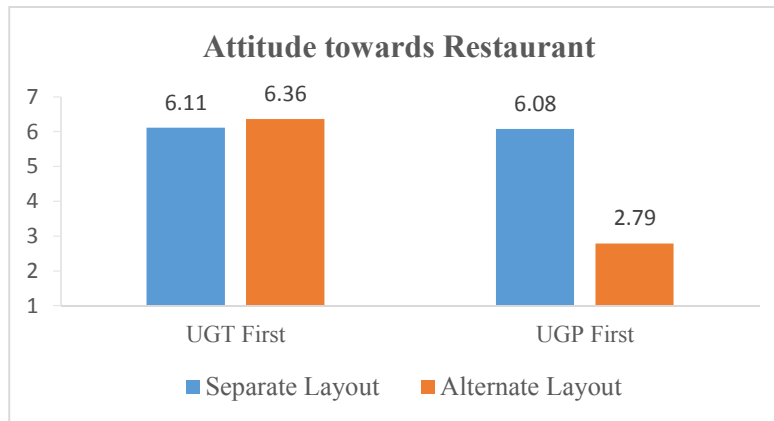


Figure 4. Interaction Impact of Sequence and Layout on Attitude

Mediation Analysis. We applied Process Model 8 (Hayes 2013) and got results as follows. The mediation impact of diagnosticity on the relationship between layout and attitude was significantly moderated by sequence (95% CI: -1.472 to -.553). That is, when UGT first, diagnosticity didn't significantly mediate the layout effect (95% CI: -.386 to .086) while when UGP first, diagnosticity significantly mediated the layout effect on attitude (95% CI: .452 to 1.270).

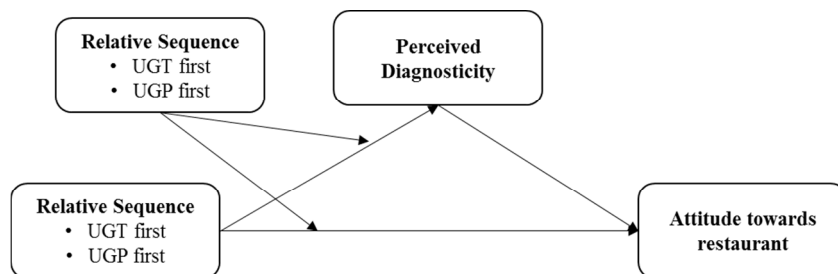


Figure 5. Moderated Mediation Analysis Model

Discussion

Summary of Results

Academic research on the presentational integration of UGP & UGT in e-WOM context is scarce. This study seeks to understand which kind of layout and sequence of picture relative to text is more effective for facilitating customers' elaboration and pleasantness feeling of e-WOM, as well as the corresponding attitude towards the product/service. The empirical results provide significant evidence for our research model and hypotheses.

Our results show that (1) in general, UGT-first presentation is more beneficial in enhancing perceived diagnosticity and the corresponding customers' evaluations the product/service than the one with UGP first; (2) separate layout helps more in customers' diagnosticity perceptions and downstream evaluations than alternate layout, especially, these effects are more obvious for UGP-first presentation than the UGT-first presentation; (3) in contrast, alternate layout is better than separate layout in inducing pleasantness in the e-WOM understanding, regardless of the sequence of UGT and UGP. These results suggest that the addition of UGP may not always create instrumental effect, depending on the information presentation (e.g., layout, sequence). The results of this experimental study provide several theoretical and managerial implications.

Theoretical Implications

First, our findings extend cue-summation theory by providing some insight into the efficiency and ease of cue summation from a channel-switching perspective. Current cue-summation theory mainly holds two arguments: one highlights the quantity of cues involved in the cue-summation, asserting that the more channels involved, the better communication will be achieved (Jiang & Benbasat 2007a); while the other one turns to the relevancy of cues, explaining that given the superiority of multichannel communication to single channel communication, cues in multichannel have to be relevant in order to work up to its advantage (Dimoka et al. 2012). However, these two arguments are basically developed from a static scope that ignores the dynamic process of channel-switching, which is definitely the central component of cue summation theory. Our findings related to relative layout and sequence of UGP to UGC vividly depicts when channel-switching between picture and text is efficient—i.e., separate layout with UGP first or generally UGT first displayed and when channel-switching is pleasant—i.e., alternate layout regardless of the channel appearing sequence.

In addition, our work contributes to the literature on e-WOM by exploiting a new form of e-WOM—i.e., user-generated picture (UGP). Existing studies on e-WOM mainly examined numeric rating and textual content (Mudambi & Schuff 2010; Yin et al. 2014). Our findings extend the literature by incorporating the impacts of UGP on consumer information processing and decision making. This research also adds to the literature on multimedia communication (Kim & Lennon 2008; Dimoka et al. 2012; Jiang & Benbasat 2007a) by exploiting the presentational integration of UGP & UGT. This paper is the first to examine the impacts of the relativity of the layout and sequence of UGP to UGT on consumer information processing.

Practical Implications

Moreover, our paper also provides guidelines for business to leverage pictures in social media to achieve strategic goals. First, our findings highlight the importance of pictures in social media on consumer information processing and decision making. Given that the presentation (e.g., layout, sequence) of the pictures in e-WOM may result in positive or negative outcomes for businesses, particularly new businesses that lack well-defined reputations can derive implications for the presentation and sorting strategies of customer opinions from this research.

Second, our research suggests that UGT displayed first acts as a guide improving the elaboration of the whole review and generating favorable attitude while UGP first functions as a trouble-maker adding noise and confusion to the elaboration and inducing unfavorable attitude towards product. Given the critical importance of information elaboration for third-party review platforms such as Yelp.com and Openrice.com, managers may be able to add “sequence of UGT&UGP” in their sorting or filtering systems to let the most easy-to-read reviews reach potential customers, as a result, increasing the sales or ROI of

ventures on the platforms.

Third, we find that separate layout drags up review diagnosticity compared to the alternate layout, especially when UGP is first presented. In contrast, alternate layout brings more pleasantness feelings to understand the review than separate layout. The opposite effects of layout in diagnosticity and pleasantness feeling which are two key intermediate outcomes of final decision making implies distinct strategies for advertising hedonic and utilitarian product/service. Concretely speaking, to advertise hedonic products (e.g., game videos), retailers may choose alternate layout with intertwined text and picture to induce more product-inconsistent pleasantness feelings, while for utilitarian products, they better adopt separate layout with text and picture separate framed in order to achieve more accurate understanding of the product.

Further Research Directions

UGP is far from fully explored in this research. This paper can be strengthened in several ways in future research. First, different from traditional mediums using pictures taken by professionals, most e-WOM pictures are taken and posted by users, and thus of varied visual quality. Given that high-quality pictures can vividly represent product while low-quality pictures may present objects in an ambiguous way, the visual quality of pictures has to be taken into account for the elaboration on the combined UGT&UGP. Therefore, the impact of additional photos in varied quality is empirically important to answer. Second, distinct from traditional advertising releasing relatively few and carefully timed images, pictures in social media appear in abundance at with great frequency. Moreover, authors of online reviews enjoy the freedom of writing their comments of various length—from simple words/phrases to long paragraphs and posting any number of photos they like in their reviews. Thus, future research may provide some insight into the impacts of word length of UGT and number of photos of UGP.

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Appendix A— Sample Characteristics

Variable	Category	Freq.	Percent
Gender	Male	95	58.6
	Female	67	41.4
Education	Did not finish high school	1	0.6
	High school graduate or some degree	52	32.1
	College graduate	75	46.3
	Postgraduate degree	34	21
Income	<\$15,000	21	13
	\$15,001-\$25,000	30	18.5
	\$25,001-\$35,000	31	19.1
	\$35,001-\$50,000	30	18.5
	\$50,001-\$75,000	29	17.9
	\$75,001-\$100,000	16	9.9
	\$100,001-\$150,000	5	3.1
	>\$150,000	0	0
Japanese food liking	Like a great deal	58	35.6
	Like a moderate amount	60	36.8
	Like a little	34	20.9
	Neither like nor dislike	8	4.9
	Dislike a little	2	1.2
	Dislike a moderate amount	0	0
	Dislike a great deal	0	0
Japanese restaurant experience	Yes	149	92
	No	13	8

Appendix B—Measurement

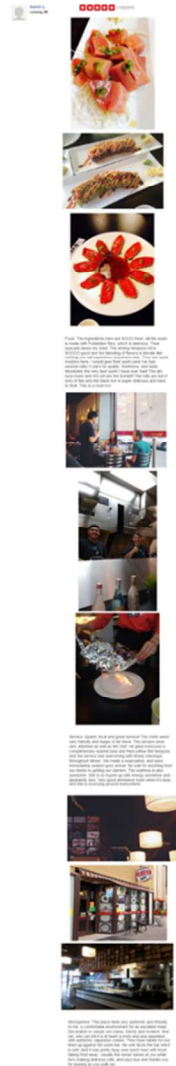
Constructs	Measurement	Source
Attitude	What do you think of this product/brand? 1. Bad/good 2. Unfavorable/favorable 3. Dislike/like	Rucker & Petty (2004)
Diagnosticity	1. The review helped me familiarize myself with the product. 2. The review helped me evaluate the product. 3. The review helped me understand the performance of the product.	Kempf & Smith (1998)
Pleasantness	1. The review makes me feel happy/unhappy (R). 2. The review makes me feel annoyed/pleased. 3. The webpage makes me feel satisfied/unsatisfied (R). 4. The review makes me feel melancholic/contented. 5. The review makes me feel hopeful/despairing(R). 6. The review makes me feel uncomfortable/comfortable	Mehrabian & Russell (1974)

Appendix C—Experimental Scenarios

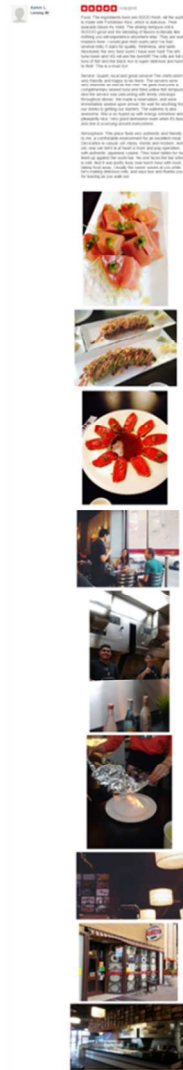
Alternate-UGT first



Alternate-UGP first



Separate-UGT first



Separate-UGP first

