

# Examining the Effect of Positive Online Reviews on Consumers' Decision Making: The Valence Framework

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## ABSTRACT

Online reviews play an important role in consumers' decision making. However, limited studies have been conducted to understand the effects of online reviews on consumers' behavior. Drawing upon the Elaboration Likelihood Model and the valence framework, a research model was developed to investigate the perceived benefits and potential risks brought by positive online reviews. The moderating effect of review skepticism was also examined. Data were collected through an online survey based on consumers' perceptions of the positive reviews from restaurants and food businesses and analyzed with partial least squares. The results indicated that argument quality and source credibility influence information usefulness, which further influences consumers' behavioral intentions. The influence of positive online reviews on perceived risk differs between high and low skepticism consumers. This research offers a more in-depth understanding of consumer information processing in an online context and benefits practitioners by allowing them to better understand consumers.

## KEYWORDS

Consumer Decision Making, Elaboration Likelihood Model, Online Reviews, Skepticism, Valence Framework

## INTRODUCTION

The development of information technology and wide adoption of social media by consumers have accelerated the distribution of online reviews. Such reviews, also known as electronic word-of-mouth (eWOM), mainly reflect consumers' opinions, evaluations, and feelings about products and services. Online reviews are easily accessible through various channels, including e-commerce websites, online review sites, and discussion forums (Cheung, Lee, & Rabjohn, 2008; Lee & Youn, 2009). It has been shown that online reviews are more effective at influencing consumers than are traditional media, because users are more likely to refer to online reviews posted by unknown consumers (ChannelAdvisor, 2011). For instance, one report showed that 78 percent of online consumers are influenced by online reviews when they make purchase decisions (eMarketer, 2013). Thus, user-generated online reviews are increasingly regarded as a powerful source of information that facilitates consumer decision making (Khatwani & Srivastava, 2017; Li, Li, Yen, & Zhang, 2016).

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Given the importance of online reviews in influencing consumer decision-making behavior, researchers have been attracted to explore how online review characteristics can influence consumer perceptions, attitudes, and behaviors (Erkan & Evans, 2016; Li et al., 2016; Shen, Zhang, & Zhao, 2016). However, two research gaps are evident in the literature. First, most studies focus on the benefits that online reviews can bring, such as perceived information usefulness (Xia & Bechwati, 2008). The potential risks posed by online reviews are largely ignored. It has been shown that many organizations have utilized the anonymity feature of online reviews to advocate for their own products or services by spreading biased opinions (Magnini, 2011; Zhang, Carpenter, & Ko, 2013). Thus, the potential risks brought by online reviews, especially positive reviews, should also be considered in research to provide a comprehensive understanding of the characteristics of online reviews in influencing consumer decision-making behavior.

Second, based on the Elaboration Likelihood Model (ELM), researchers have demonstrated that individuals vary in their ability and motivation when evaluating online reviews and making purchasing decisions. However, when examining the effects of online reviews on consumer behavior, researchers have mainly focused on the moderating effects of involvement (Lee, Park, & Han, 2008), prior knowledge (Park & Kim, 2008), gender (Zhang, Cheung, & Lee, 2014), and product characteristics (Zhu & Zhang, 2010). Studies exploring the moderating role of consumer skepticism are limited (Reimer & Benkenstein, 2016; Sher & Lee, 2009). In a recent survey, 80 percent of consumers reported that they were concerned about the authenticity of online reviews and suspicious of positive reviews (Williams, 2012). Thus, consumers may develop suspicious attitudes toward positive online reviews (Larson & Denton, 2014; Tarafdar, Pullins, & Ragu-Nathan, 2014; Willemsen, Neijens, & Bronner, 2012), which may further influence their decision-making behavior (Darke & Ritchie, 2007). Zhang et al. (2016) argued that some unexpected results in the online review literature (Dou, Walden, Lee, & Lee, 2012; Qiu, Pang, & Lim, 2012) may have resulted from the exclusion of the effects of Internet users' skepticism. Consequently, individuals' skepticism levels should be considered when examining the effects of positive online reviews on consumer perceptions and behaviors (Zhang et al., 2016).

To fill these two research gaps, this study attempts to examine the effect of positive online reviews on consumer behavior intention by considering both the benefits and risks brought by online reviews and the moderating role of the individual's skepticism in the review evaluation process. In summary, this study addresses the following three research questions:

1. How do positive online review characteristics affect consumers' perceived usefulness and risk?
2. How would perceived usefulness and perceived risk affect consumer behavior intention?
3. How does skepticism moderate the effect of positive online reviews on consumers' perceived risk?

The remainder of this paper is organized as follows. First, the theoretical background to this research is presented. Research hypotheses are then proposed based on the literature. The research methodology and results of the data analysis are then presented. Next, the findings, theoretical implications, and practical implications are discussed. Finally, the study is concluded by describing its limitations and possible future research opportunities.

## **THEORETICAL FOUNDATION AND HYPOTHESIS DEVELOPMENT**

### **Elaboration Likelihood Model**

Developed by Petty and Cacioppo (1986), the ELM is regarded as one of the most prominent theories in information processing. According to the ELM, information can influence people's attitudes and behaviors via two routes: the central and peripheral routes. The central route involves individuals investing high cognitive effort in evaluating the content of information. Argument quality, which

refers to the extent to which individuals perceive received information as persuasive and informative, is the most important factor in the central route (Sussman & Siegal, 2013; Zhang & Watts, 2008). In contrast, the peripheral route involves individuals using the environmental cues in a message to assess information. Heuristic and non-content cues, such as source credibility and number of reviews, are representatives of the peripheral route that have been verified in the literature (Sussman & Siegal, 2013; Zhang & Watts, 2008). Researchers have suggested that when individuals process information, central and peripheral factors are considered simultaneously (Sussman & Siegal, 2013). Moreover, the ELM suggests that the elaboration likelihood, which is determined by an individual's motivation and ability to elaborate, moderates the effects of central and peripheral cues on attitude change (Petty & Cacioppo, 1986). Motivation refers to "the individual's personal relevance to the persuasive message," while ability is "manifest in the individual's cognitive competence or prior expertise with the attitude object." (Petty & Cacioppo, 1986, p.359). The ELM has been used extensively in the online review context to explore how individuals process information (Li, 2015; Shen et al., 2016). In this study, we adopt this theory to understand how argument quality, source credibility, and quantity of online reviews can influence the consumer decision-making process. The moderating role of skepticism is also examined based on the ELM.

### **The Valence Framework**

In this study, the valence framework serves as a useful theoretical basis for examining the benefits and risks brought by online reviews. The valence framework was proposed by Peter and Tarpey (1975), who used a "cognitive-rational" customer decision-making model to explain consumer decision-making behavior. According to this framework, when consumers make purchasing decisions, they are often in possession of incomplete information, which leads to some degree of risk and uncertainty. However, despite the potential risks involved in relying on online reviews, the perceived benefit provides consumers with an incentive in their decision-making behavior. On one hand, consumers are motivated to minimize the negative effects; on the other, they are motivated to maximize the expected positive effects. Thus, the central premise of this theory is that consumers make decisions to maximize the net valence resulting from negative and positive effects (Kim, Ferrin, & Rao, 2008).

Studies have shown that the valence framework is powerful at explaining consumer decision-making behavior in the online environment (Gao & Waechter, 2017; Kim et al., 2008; Kim, Ferrin, & Rao, 2009; Li, Wang, Lin, & Hajli, 2018; Lin, Wang, Wang, & Lu, 2014). For instance, Lu et al. (2011) adopted the valence framework to explore the negative valences of perceived cost and perceived risk, and the positive valences of relative advantage, compatibility, and image, on consumers' intentions to use mobile payment services. Gao and Waechter (2017) applied the valence framework to explore consumers' initial trust facilitators and inhibitors of adoption of mobile payments. The positive valences they identified include perceived system quality, information quality, and service quality and the negative valences include perceived uncertainty. Li et al. (2018) developed a model based on the valence framework to explain users' intentions to seek and share health information on social media. When consumers make decisions based on online reviews, they are exposed to both perceived risk, because of uncertainty about online reviews, and perceived usefulness brought about by the informativeness of the reviews. Thus, it is appropriate to adopt this framework to explore the effects of online reviews on the consumer decision-making process by considering both the benefits and risks brought by online reviews.

### **Hypothesis Development**

In this study, we focus on positive online reviews for two main reasons. First, as shown in Karimi and Wang's (2017) and Park and Lee's (2008) studies, most online reviews are positive in nature. Recognizing the benefits brought by positive online reviews, some organizations attempt to hire individuals or public relations firms to post biased or fake positive reviews to attract consumers (Zhang et al., 2016). Thus, the potential risks brought by online reviews are mainly from positive ones. Second,

consumers show skepticism mainly toward positive reviews rather than negative reviews. As one of our research objectives was to examine the moderating effect of skepticism, we therefore examine argument quality, source credibility, and perceived quantity of positive online reviews to highlight their effects on behavioral intention. In the following sections, the research hypotheses are developed.

### *The Negative Valence—Perceived Risk*

Perceived risk refers to a consumer's perceptions of the unpleasant, uncertain, and possibly undesirable consequences of adopting the information on review websites (Chang & Wu, 2012). Consumers' perceived risk is regarded as an important factor in influencing consumers' decision making in the online context (Antony, Lin, & Xu, 2006). The Internet environment is full of uncertainty and vulnerability (Zhang et al., 2016). Thus, individuals can easily perform opportunistic behaviors in this environment by spreading fake information. Dishonest activities are relatively easy to undertake via online reviews (Larson & Denton, 2014; Tarafdar et al., 2014). Thus, consumers will be attentive to risk when browsing online reviews, and such risk may influence their purchase intention. Therefore, we hypothesize that:

**H1a:** Perceived risk is negatively related to behavior intention.

### *The Positive Valence—Information Usefulness*

Information usefulness is the direct benefit brought by online reviews (Shen et al., 2016). It refers to an individual's perception that using the information will enhance their performance (Bailey & Pearson, 1983; Cheung et al., 2008). As people are more likely to process information when they think it is useful, information usefulness is regarded as one of the main factors influencing consumers' purchase intentions (Lee & Koo, 2015). On online review websites, if consumers find that the recommended information is useful, they are more likely to generate purchase intentions toward merchants suggested by others in the reviews. Therefore, it is proposed that:

**H1b:** Information usefulness is positively related to behavioral intention.

### *Argument Quality*

Argument quality refers to an individual's perception of the informativeness and persuasiveness of online reviews (Chu & Kamal, 2008). Park et al. (2007) argued that online reviews function as both informant and recommender for consumers to make decisions. Research has indicated that informative and persuasive arguments can contribute to favorable decision outcomes (Angst & Agarwal, 2009). In online review communities, a high quality of argument is beneficial to consumers because it provides informative product evaluations (Cheung et al., 2008; Yuan, Chu, & Cai, 2018). Thus, high-quality online reviews will be useful for consumers to evaluate products and services, and will be employed by consumers to reduce the uncertainty and risks associated with their purchasing decisions. Based on the above discussion, it is hypothesized that:

**H2a:** Argument quality is negatively related to perceived risk.

**H2b:** Argument quality is positively related to information usefulness.

### *Source Credibility*

Source credibility refers to an individual's perception of the reliability and trustworthiness of a review source (Chaiken, 1980). More specifically, it is defined as the extent to which the review source is perceived by information recipients to be expert and trustworthy (Petty & Cacioppo, 1986). In the Internet environment, individuals are free to post reviews regarding their evaluations, opinions, and

feelings toward certain products or services, without disclosing their real identity. Because of the ease of posting and the anonymity of online reviews, unethical behavior such as posting fake reviews online has been found to be common by merchants in recent years (Zhang et al., 2016). A number of studies have reported manipulation of online reviews by merchants (Hu, Bose, Koh, & Liu, 2012; Mayzlin, Dover, & Chevalier, 2014). Thus, it is important for information recipients to judge the expertise and trustworthiness of contributors, although this is quite difficult.

Many online review sites have developed multiple methods to manage contributors, as well as facilitating information recipients' judgments about the source credibility of contributors. For instance, registered users can create personal pages to describe themselves. Users are also assigned different "levels" or "stars" based on their past contributions and posting records. By referring to these personal pages and ranking information, information recipients are able to perceive how credible the contributor is. If information recipients feel that comments are posted by contributors with a higher level of source credibility, they will have a higher perception of the usefulness of those comments. This high source credibility can also decrease consumers' perceived risk associated with decision making. Thus, the following hypotheses are proposed:

**H3a:** Source credibility is negatively related to perceived risk.

**H3b:** Source credibility is positively related to information usefulness.

### *Perceived Quantity of Reviews*

Perceived quantity of reviews refers to the volume of online reviews as shown on an online review website (Park et al., 2007). It indicates the popularity of products and services. This indicator of review quantity distinguishes eWOM from traditional WOM in offline environments (Chatterjee, 2001; Dellarocas, 2003). On most online review sites and e-commerce websites, the number of reviews for each product or service is visible to consumers. This information acts as a heuristic cue in their information processing (Zhang, Zhao, Cheung, & Lee, 2014). If consumers find that a particular product has a large number of reviews generated by other consumers, they will be confident about the quality of the product, which helps decrease their perceived risk. In addition, research has shown that the quantity of reviews is an effective tool facilitating consumers' rapid decision making in an online context (Zhang et al., 2014). Based on the above discussion, it is proposed that:

**H4a:** Perceived quantity of reviews is negatively related to perceived risk.

**H4b:** Perceived quantity of reviews is positively related to information usefulness.

### *Review Skepticism*

According to Obermiller and Spangenberg (1998), skepticism is a tendency toward disbelief. Sher and Lee (2009) found that consumers' belief or disbelief toward marketing messages are generated through socialization and purchasing experiences. Thus, consumer skepticism is stable and generalizable in that it reflects a consumer's implicit views of how the marketplace works. In the online review context, there is information asymmetry between the review contributor and review recipient in terms of the intentions and characteristics of review contributors (Akerlof, 1970). Specifically, information about reviewer contributors is normally not available because of the anonymous nature of online reviews (Kleinaltenkamp & Jacob, 2002). Thus, the review recipient is at an informational disadvantage and will find it difficult to judge the reliability of online reviews. It has been suggested that every consumer has a certain basic level of skepticism toward online reviews depending on their prior experience of processing information (Friestad & Wright, 1994). It has also been demonstrated that consumers differ in their skepticism levels even when they receive the same signals (Reimer & Benkenstein, 2016). If consumers interpret a recommendation as driven by hidden vested motives, attempts at persuasion

will reduce the trustworthiness of the message and impose higher-level risks (Verlegh, Ryu, Tuk, & Feick, 2013). Based on the above discussion, the following hypothesis is proposed:

**H5:** Review skepticism is negatively related to perceived risk.

Obermiller and Spangenberg (1998) proposed that consumers with high skepticism levels perceive smaller differences in situational factors (such as quality and quantity of messages) compared with consumers with low skepticism levels. Thus, highly skeptical consumers are more likely to disbelieve online reviews for particular products or services without considering the characteristics of the online reviews. In other words, consumers with higher skepticism tend to rely on their own beliefs to evaluate information instead of using extrinsic situational factors, such as argument quality (Angst & Agarwal, 2009). Conversely, consumers with low skepticism are deemed as naïve and less mature, with a less developed cognitive ability (Friestad & Wright, 1994). Based on the ELM, less skeptical consumers do not enjoy cognitive effort and prefer to rely on the opinions of others when dealing with uncertain issues. Thus, it is proposed that skepticism can moderate the influence of online reviews on consumers' perceived risk:

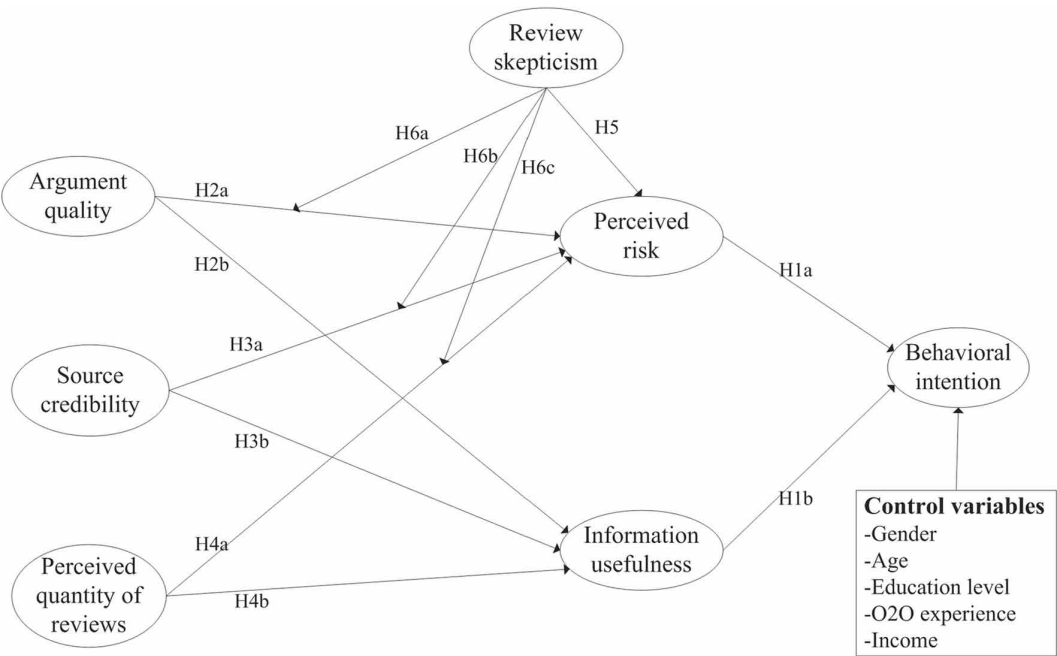
**H6a:** Review skepticism has a moderating effect on the relationship between argument quality and perceived risk.

**H6b:** Review skepticism has a moderating effect on the relationship between source credibility and perceived risk.

**H6c:** Review skepticism has a moderating effect on perceived quantity of reviews and perceived risk.

The research model is presented in Figure 1, which summarizes all the hypotheses.

Figure 1. The research model



## METHODOLOGY

### Research Setting

Dianping.com, a popular online review site ([www.dianping.com](http://www.dianping.com)) launched in 2003 in China, was selected as the research site for several reasons. First, it is one of the largest and most popular online review sites in China. By the first quarter of 2015, the number of active users of dianping.com had exceeded 200 million (Xiao, Mi, Zhang, & Ma, 2017), and approximately 100 million reviews for 20 million member merchants in more than 2,500 cities were posted. Second, the merchants on dianping.com cover a wide range of services including restaurants, hotels, and spas, of which restaurants are the most popular. Each merchant has a unique page on the review site, with basic information and reviews posted by contributors. The number of reviews for each merchant is shown on the page. Third, each contributor must create a personal account to post reviews. Readers can inspect the name, level, and all reviews posted by a contributor. Finally, the site facilitates two-way, member-to-member interactions where readers can provide feedback to reviewers on what they have written. Dianping.com is considered an ideal website for our data collection because it enables subjects to evaluate review quality, source credibility, and quantity of reviews.

### Web Survey Method

This study employed a web survey method to test the hypotheses, for three reasons. First, web surveys target respondents who are Internet users (Wellman & Haythornthwaite, 2008). From the perspective of consumers, online reviewers effectively exist only in cyberspace, this method is particularly useful and fits well with the current research context. Second, the web survey method allows for collection of data from a large population with diverse backgrounds, which can improve the generalization of research findings (Fowler Jr, 2013). Finally, a rigorous survey design based on established scales is effective for achieving high validity and reliability of research findings (Rattray & Jones, 2007). Overall, the web survey approach can improve the generalizability, external validity, and quality of research and thus was employed in the current study.

### Measures

To ensure the validity of all the instruments used, each construct was measured with established scales from previous studies, with minor changes in the wording to fit the current research context. In the research model, all variables were modeled as reflective indicators because they were viewed as effects of latent variables (Sohaib & Kang, 2015). All items were measured on a five-point Likert scale. The final items used in each scale are listed in Table 5 in the Appendix.

The original questionnaire was in English. As the data were collected in Mainland China, the questionnaire was first translated into Chinese by two bilingual experts who have experience in using dianping.com. The Chinese version questionnaire was then independently translated back into English by two other bilingual experts. The translation was compared with the original version of the questionnaire to ensure consistency and accuracy.

### Sample and Data Collection Procedure

A pilot test was conducted using a convenience sample of 15 respondents who had previously used dianping.com. The respondents were asked to refine the wording of the questionnaire, assess its logical consistency, judge ease of understanding, and identify areas for improvement.

An online survey was developed on sojump.com, which is a professional online survey website in China. The announcements were posted on the public forum of dianping.com to recruit participants. Respondents were asked to recall positive restaurant reviews they had read on dianping.com in the previous three days and to consider visiting the restaurant after reading the reviews. Restaurant and food reviews were selected because they constitute the most common online reviews on dianping.com. This may be because food is more frequently purchased than other products in daily life. To improve the

response rate, each respondent was provided an incentive of 10 RMB (around 1.5 USD). The online survey was designed to allow only one submission per computer, mobile phone, and IP address. This restriction aimed to minimize the possibility for biased responses driven by the monetary incentive. The survey ran for two months and the researchers scrutinized all responses, omitting those with the same answer for all questions to ensure validity and reliability of the survey results. Finally, 399 valid responses were collected. To estimate the non-response bias, the first and last 25 percent responses were compared in terms of demographic information using a chi-square test. There were no significant differences in demographic characteristics of early and late responders.

The demographic information of the respondents is summarized in Table 1. Of the respondents, 59.9 percent were male and 40.1 percent were female. They were relatively young, the majority (71.7 percent) being aged 18–25 years. More than half of the participants (52.1 percent) had a college degree. This distribution is similar to sample distributions in previous studies examining online reviews in China. For instance, 67.9 percent of participants in Cheung et al.'s (2009) study of credibility of eWOM were younger than 25. In Cheung et al.'s (2008) study of consumers' adoption of online reviews, 73 percent of participants were aged below 25. In Luo et al.'s (2013) study of consumer online recommendation credibility, 83 percent of the participants were aged below 24 and

**Table 1. Respondents' demographic profiles (N = 399)**

Measure	Items	Frequency	Percent
Gender	Male	239	59.9
	Female	160	40.1
Age	18–25	82	20.6
	26–35	286	71.7
	36–45	29	7.3
	Above 45	2	0.5
Highest education level	High school or below	27	6.8
	Some college	208	52.1
	Bachelor's degree	124	31.1
	Master's degree or above	40	10
Frequency of using dianping.com to browse online reviews per month	Less than 3 times	72	18
	4–8times	206	51.6
	9–15 times	84	21.1
	More than 15 times	37	9.3
Frequency of going to restaurant after browsing reviews on dianping.com	Less than 3 times	77	19.3
	4-8 times	229	57.4
	9-15 times	86	21.6
	More than 15 times	7	1.8
Average monthly income (CNY)	Less than 1,000	8	2
	1,000–3,000	70	17.5
	3,001–5,000	225	56.4
	5,001–8,000	78	19.5
	More than 8,000	18	4.5



55 percent had a bachelor degree. With respect to their frequency of use of dianping.com to browse reviews, 57.4 percent of the respondents indicated that they browse 4–8 times per month. Regarding the frequency of eating at a restaurant after browsing reviews, 57.4 percent of respondents indicated that they ate at restaurants 4–8 times, and 21.6 percent visited restaurants 9–15 times per month.

## Common Method Bias

Two statistical analyses were performed to assess potential common method bias. First, as suggested by Podsakoff and Organ (1986), Harman's single factor test was conducted on the seven constructs in the research model. The results revealed that the most significant factor explained only 30.05 percent of the variance, indicating that no single factor explained most of the variance. Second, the procedures proposed by Liang et al. (2007) were used to detect possible common method bias. Specifically, we included in the partial least squares (PLS) model a common method factor whose indicators included all the principal constructs' indicators, and calculated each individual construct's variances that were substantively explained by the principal construct and by the method (see Table 2). The results

**Table 2. Common method bias analysis**

Construct	Indicator	Substantive Factor Loading (R1)	R1 <sup>2</sup>	Method Factor Loading (R2)	R2 <sup>2</sup>
Argument quality	AQ1	0.814**	0.663	-0.015	0.000
	AQ2	0.896**	0.803	-0.045	0.002
	AQ3	0.762**	0.581	0.088*	0.008
	AQ4	0.843**	0.711	-0.028	0.001
Source credibility	SC1	0.815**	0.664	-0.019	0.000
	SC2	0.846**	0.716	-0.033	0.001
	SC3	0.807**	0.651	-0.007	0.000
	SC4	0.804**	0.646	0.056	0.003
Perceived quantity of reviews	PQR1	0.870**	0.757	-0.015	0.000
	PQR2	0.844**	0.712	0.058*	0.003
	PQR3	0.882**	0.778	-0.044	0.002
Perceived risk	PR1	0.860**	0.740	-0.023	0.001
	PR2	0.880**	0.774	0.019	0.000
	PR3	0.887**	0.787	0.004	0.000
Information usefulness	IU1	0.813**	0.661	0.049	0.002
	IU2	0.868**	0.753	0.018	0.000
	IU3	0.902**	0.814	-0.069	0.005
Review skepticism	RS1	0.842**	0.709	-0.042	0.002
	RS2	0.867**	0.752	0.003	0.000
	RS3	0.882**	0.778	-0.008	0.000
	RS4	0.883**	0.780	0.047	0.002
Behavioral intention	BI1	0.813**	0.661	-0.023	0.001
	BI2	0.822**	0.676	0.016	0.000
	BI3	0.834**	0.696	0.064	0.004
	BI4	0.861**	0.741	-0.064	0.004
Average		<b>0.848</b>	<b>0.720</b>	<b>-0.001</b>	<b>0.002</b>

demonstrated that the average substantively explained variance for the indicators was 0.720, while the average method-based variance was 0.002. The ratio of substantive variance to method variance was 439:1. In addition, most method factor loadings were not significant. Based on these results, we contend that common method bias is unlikely to be a serious concern for this study.

## Data Analysis Technique

The data were analyzed using Smart PLS 2.0 for three reasons. First, compared with covariance-based structural equation modeling (CBSEM) techniques such as AMOS, which requires a sound theory base, PLS supports exploratory research and aims to enable theory building (Chin, 1998; Hair Jr, Sarstedt, Hopkins, & Kuppelwieser, 2014). In other words, PLS is more appropriate for the early stages of theoretical development as is the case in our study because the effects of characteristics of positive online reviews on consumers' perceived risk and the moderating roles of review skepticism remain under-explored in research. Second, PLS requires no restriction on data distribution, unlike CBSEM techniques (Hair, Ringle, & Sarstedt, 2011). As data collected in this study using online surveys failed to follow a multivariate normal distribution, PLS is more suitable. Finally, the product indicator method developed by Kenny and Judd (1984) for a moderation effect test is implemented in PLS by Chin et al. (2003). PLS thus allows us to estimate the moderation effect, measurement model, and structural model simultaneously in one operation. Therefore, PLS is suitable for the current study.

## RESULTS

### Measurement Model

To evaluate the measurement model, we examined the measurement items using convergent validity and discriminant validity. Convergent validity was assessed by (1) the reliability of the items, (2) the composite reliability (CR) of the constructs, and (3) the average variance extracted (AVE) (Chin, 1998). Table 3 summarizes the item loadings, CR, and AVE, showing that all items have loadings greater than 0.707 on their respective constructs, which is above the minimal requirement suggested by Chin (1998), indicating reliability of all indicators. The CR for all constructs ranged from 0.890 to 0.924. Considering an acceptance level of 0.7 (Chin, 1998), these values were more than satisfactory. The AVE indicates the reliability of the construct. It is suggested that the AVEs for reflective construct should be above 0.5 (Chin, 1998), which means that at least 50 percent of the variance should be accounted for. Results in Table 3 show that the AVE score for all constructs met this minimum requirement.

Discriminant validity was assessed by examining the relationships between the correlations among constructs and the square roots of the AVEs (Chin, 1998). Fornell and Larcker (1981) suggested that the square roots of the AVEs of constructs should be greater than the correlations among the constructs. Table 4 summarizes the correlations among constructs, which indicate that the square root of each AVE value was greater than the off-diagonal element, which confirms the discriminant validity of the variables.

### Structural Model

Figure 2 shows the structural model results, with their overall explanatory power and significant path coefficients. The significance of the path coefficient was estimated using a bootstrapping procedure with replacement using 1,000 subsamples. The results indicated that 39.4 percent of the variance in behavioral intention was explained. In addition, 49.5 percent of the variance in perceived risk and 37.5 percent of the variance in information usefulness was explained.

The results demonstrated that perceived risk had a significant negative effect on behavior intention ( $\beta = -0.401$ ,  $p < 0.01$ ), and information usefulness had a significant positive effect on behavioral

Table 3. Construct reliability and validity

Constructs	Items	Loadings	CR	AVE
Argument quality	AQ1	0.800	0.898	0.687
	AQ2	0.857		
	AQ3	0.834		
	AQ4	0.823		
Source credibility	SC1	0.803	0.890	0.668
	SC2	0.816		
	SC3	0.798		
	SC4	0.852		
Perceived quantity of reviews	PQR1	0.843	0.899	0.747
	PQR2	0.863		
	PQR3	0.887		
Perceived risk	PR1	0.877	0.908	0.766
	PR2	0.865		
	PR3	0.884		
Information usefulness	IU1	0.854	0.895	0.740
	IU2	0.882		
	IU3	0.885		
Review scepticism	RS1	0.878	0.924	0.754
	RS2	0.860		
	RS3	0.886		
	RS4	0.849		
Behavioral intention	BI1	0.792	0.900	0.692
	BI2	0.835		
	BI3	0.886		
	BI4	0.812		

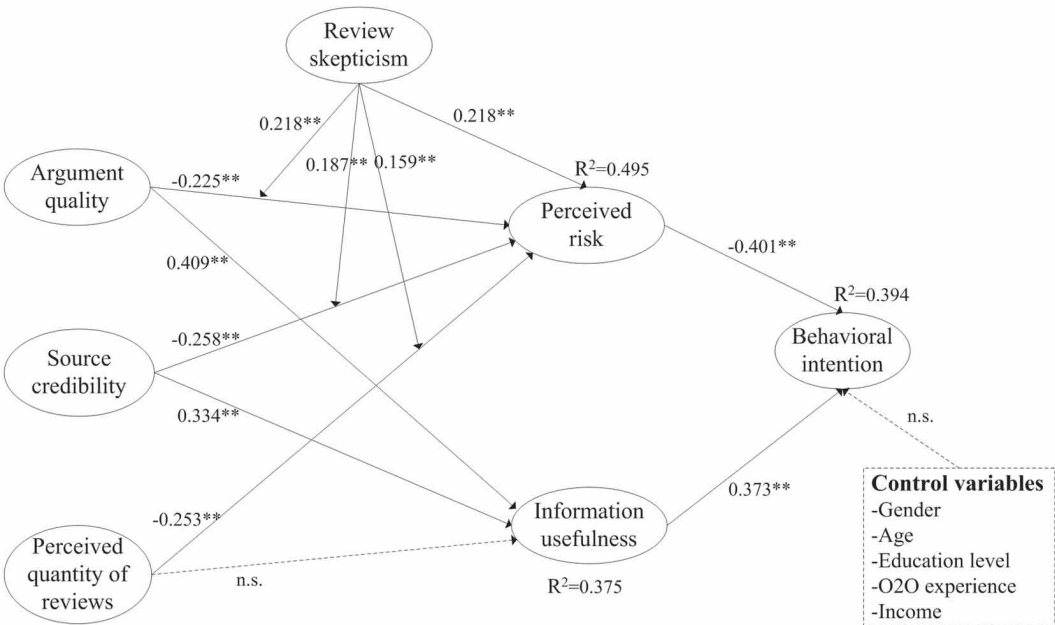
Table 4. Correlations between constructs

	Mean	S.D.	AQ	SC	PQR	PR	IU	RS	BI
AQ	3.844	0.655	<b>0.829</b>						
SC	3.652	0.726	0.284	<b>0.817</b>					
PQR	4.007	0.656	0.217	0.122	<b>0.864</b>				
PR	2.956	0.935	-0.405	-0.375	-0.390	<b>0.875</b>			
IU	3.978	0.679	0.517	0.457	0.194	-0.306	<b>0.860</b>		
RS	2.818	0.942	-0.271	-0.287	-0.112	0.350	-0.189	<b>0.868</b>	
BI	3.964	0.596	0.312	0.344	0.217	-0.515	0.496	-0.218	<b>0.832</b>

Note1: S.D.=Standard deviation; AQ=Argument quality; SC=Source credibility; PQR=Perceived quantity of reviews; PR=Perceived risk; IU=Information usefulness; RS=Review skepticism; BI=Behavioral intention

Note 2: the bold numbers in the diagonal row are the square roots of the AVE

Figure 2. Structural model results



Note: \*\* $p < 0.01$ ; n.s. nonsignificant

intention ( $\beta = 0.373, p < 0.01$ ), supporting H1a and H1b, respectively. The findings further indicated that argument quality ( $\beta = -0.225, p < 0.01$ ), source credibility ( $\beta = -0.258, p < 0.01$ ), and perceived quantity of reviews ( $\beta = -0.253, p < 0.01$ ) all had significant negative effects on perceived risk. Thus, H2a, H3a, and H4a were supported. Argument quality ( $\beta = 0.409, p < 0.01$ ) and source credibility ( $\beta = 0.334, p < 0.01$ ) were demonstrated to have a significant positive effect on information usefulness, whereas perceived quantity of reviews had no significant effect on information usefulness. Thus, H2b and H3b were supported, and H4b was rejected. Skepticism was also found to have a significant positive effect on perceived risk ( $\beta = 0.218, p < 0.01$ ), supporting H5.

### Moderation Analysis

Using the PLS-product indicator approach proposed by Chin et al. (2003), the moderating effect of review skepticism was tested. The outcomes revealed that review skepticism significantly moderated the negative effects of perceived risk of argument quality ( $\beta = 0.218, p < 0.01$ ), source credibility ( $\beta = 0.187, p < 0.01$ ), and perceived quantity of reviews ( $\beta = 0.159, p < 0.01$ ), supporting H6a–H6c. Figures 3–5 show the interaction pattern using Aiken and West's (1991) procedure for computing slopes one standard deviation above and below the mean of review skepticism. These results indicate the relationships between argument quality, source credibility, perceived quantity of reviews, and perceived risk under high and low levels of review skepticism. It is evident that argument quality, source credibility, and perceived quantity of reviews can negatively affect perceived risk only under the condition of low review skepticism.

The structural model results for the high and low review skepticism groups were compared (Figures 6 and 7). For the low skepticism group of consumers, argument quality ( $\beta = -0.317, p < 0.01$ ), source credibility ( $\beta = -0.320, p < 0.01$ ), and quantity of online reviews ( $\beta = -0.408, p < 0.01$ ) negatively influenced perceived risk. For the high skepticism group of consumers, argument

Figure 3. The moderating effect of review skepticism on the relationship between argument quality and perceived risk

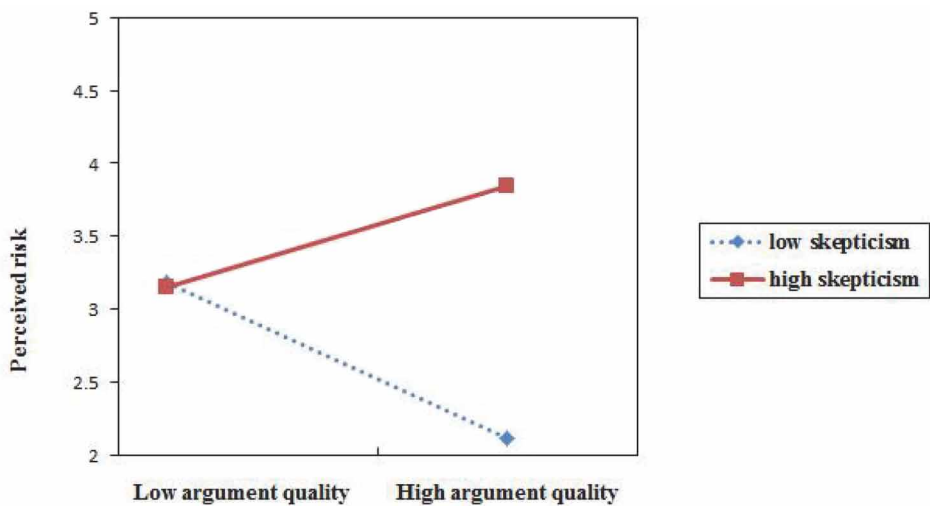
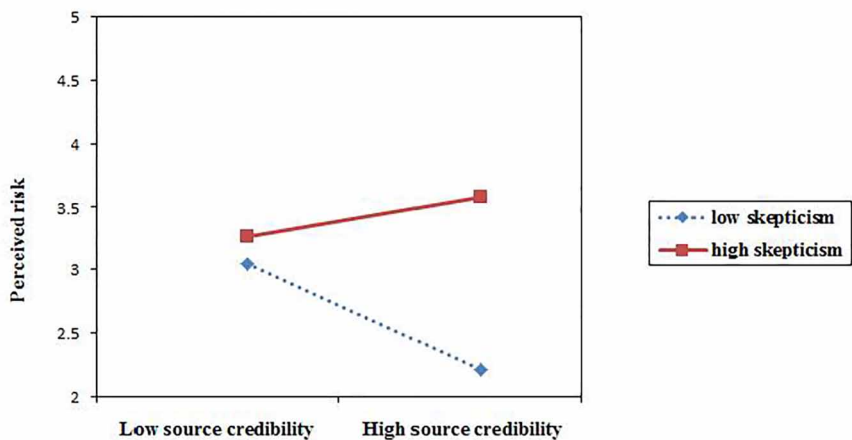


Figure 4. The moderating effect of review skepticism on the relationship between source credibility and perceived risk



quality ( $\beta = 0.396, p < 0.01$ ) and quantity of online reviews ( $\beta = 0.333, p < 0.01$ ) positively influenced perceived risk, whereas source credibility had no effect on perceived risk.

## DISCUSSION AND IMPLICATIONS

### Discussion of Key Findings

Three major findings emerged from the results. First, information usefulness and perceived risk can significantly influence consumer behavior intention. On one hand, this finding supported the valence framework in which both the benefits and potential risks play critical roles in consumer decision-making behavior; on the other, it confirmed results from prior studies demonstrating the information usefulness and behavior intention relationship (Shen, Cheung, & Lee, 2013; Shen et al., 2016).

Figure 5. The moderating effect of review skepticism on the relationship between perceived quantity of reviews and perceived risk

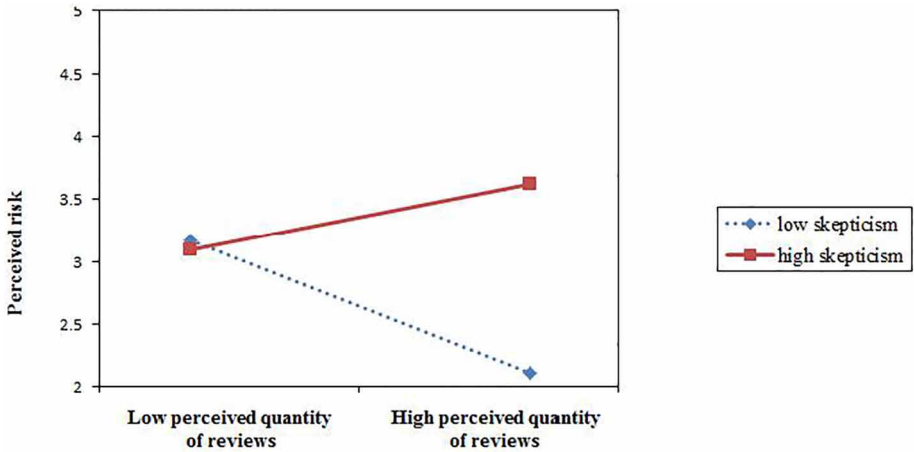
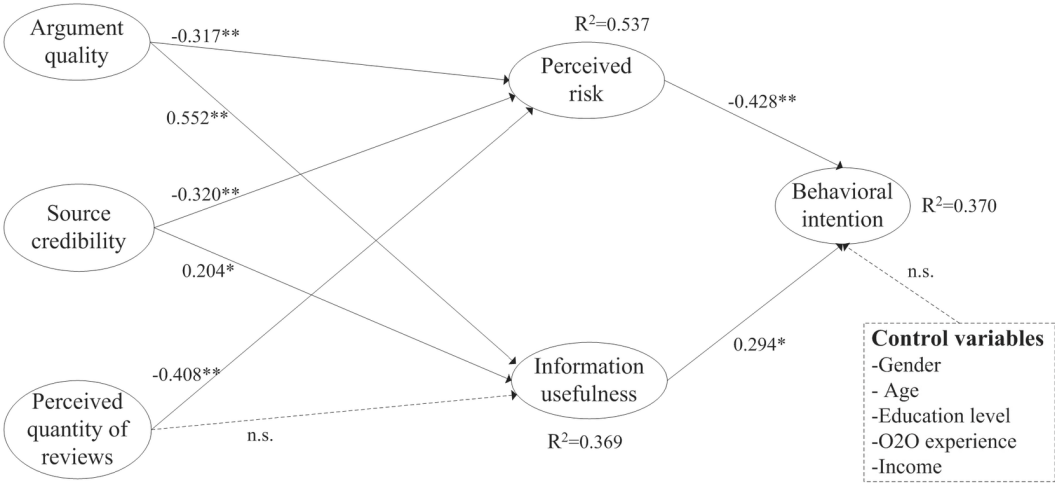


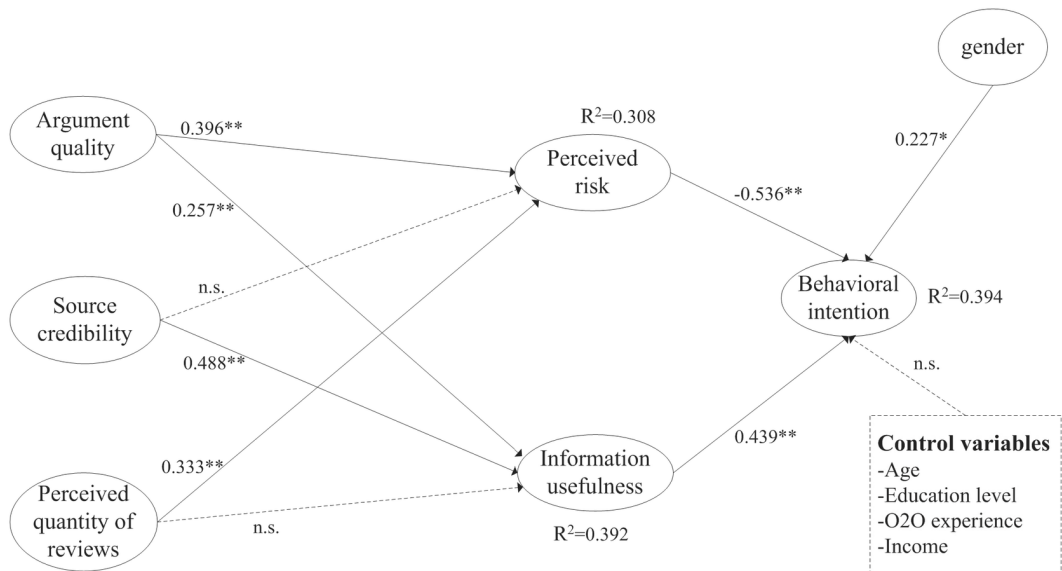
Figure 6. Structural model results for low review skepticism group (mean - ISD)



Note: \*\* $p < 0.01$ ; n.s. nonsignificant

Second, this study found that argument quality and source credibility can significantly affect perceived usefulness, which confirms the important role of these two informational factors in predicting information usefulness, as suggested in prior studies (Bhattacharjee & Sanford, 2006; Shen et al., 2013; Shen et al., 2016). However, it was found that perceived quantity of online reviews did not influence perceived usefulness. These results indicate that consumers give more importance to the content and source credibility of online reviews when judging their usefulness. Having a large number of online reviews may not necessarily be useful for consumers when evaluating the usefulness of online reviews. Despite the nonsignificant effect of perceived quantity of reviews on information usefulness, it was found that perceived quantity of reviews could still influence consumer behavior intention via perceived risk, supporting the result from Zhang et al.'s (2014) study that quantity of online reviews can affect consumers' behavioral intention.

Figure 7. Structural model results for the high review skepticism group (mean + 1SD)



Note: \*\*p<0.01; n.s. nonsignificant

Finally, this study found that review skepticism can moderate the effects on perceived risk, of argument quality, source credibility, and perceived quantity of online reviews. For consumers with low review skepticism, argument quality, source credibility, and perceived quantity of reviews can decrease their perceived risk, whereas for consumers with high review skepticism, argument quality and perceived quantity of reviews increase, rather than decrease their perceived risk. This may be because of the online astroturfing that has occurred commonly in recent years (Larson & Denton, 2014; Willemsen et al., 2012). When we check negative online reviews, it is apparent that many consumers complain about being misguided by fake reviews that result in financial and psychological loss. Thus, when consumers with high review skepticism see reviews with a large quantity and high quality, they may worry about the authenticity of these reviews. For these consumers, the nature of effective online reviews that can help reduce their perceived risk deserves further investigation.

## Implications for Research

This study has several important theoretical implications. First, it is the first to apply the valence framework to investigate consumer decision making in the online review context. It extends the application scope of the valence framework. The valence framework explains the consumer decision-making process. Our global literature review in the Information Systems field showed that the valence framework has been employed in the online shopping (Kim et al., 2008), mobile payments (Gao & Waechter, 2017), and health information sharing on social media (Li et al., 2018) contexts. However, it has seldom been used to explain consumer decision-making 'behavior in the online review context. By applying the valence framework in the online review context, we found that consumers evaluate both the perceived benefits and potential risks when making decisions based on online review information. Future research investigating consumer behavior in the online review context might employ this theory to explore other aspects that consumers emphasize in their decision-making processes.

Second, by combining the ELM and the valence framework, this research augments both theories, by creating links between them. Specifically, although the ELM has been extensively employed in the online review context to understand how consumers process information via the central and peripheral

routes, the majority of these studies considered only the one-sided perspective of beneficial aspects of online reviews. This study is among the first to take into account potential risks in addition to the perceived benefits brought by online reviews. This integration exploration can provide a more comprehensive understanding of the effects of online review characteristics on consumers' decision-making behaviors.

Finally, this study contributes to the online review literature by considering a potentially important personality factor in moderating the effects of online reviews on consumers' perceived risk. The ELM has suggested that some individual characteristics might be potential moderators affecting the relationship between online review characteristics and consumers' perceptions. Factors such as motivation, involvement, and ability (prior knowledge) have been frequently examined in prior studies (Park et al., 2007; Zhu & Zhang, 2010). Cheung and Thadani (2012) conducted a literature review analysis of the effect of eWOM communication and called for research to further investigate how other factors related to consumers' characteristics, such as consumer skepticism, affect consumers' purchase decisions. This study is among the first to respond to Cheung and Thadani's (2012) call for examining more moderators in consumers' information processing, and fills this gap in the literature.

### **Implications for Practice**

From a practical perspective, this study provides several valuable guidelines for online review website administrators. The results show that review quality and source credibility can significantly influence the perceived usefulness of online reviews and ultimately influence consumers' purchase intentions; thus online review websites should focus on improving review quality and source credibility. To improve review quality, review website administrators could provide guidelines to users on how to contribute good product evaluations; this may include templates identifying aspects of products that could be considered and included in their messages. To improve source credibility, the review website administrator could initiate reward schemes to recognize reputable contributors who consistently post high-quality reviews. Having an effective rating system to reward and improve source credibility would be beneficial to consumers in helping them form their judgments of review credibility.

In addition, as consumers with high review skepticism and low review skepticism interpret online reviews in different ways, an online review website could develop separate strategies tailored to these two groups of consumers. For low skepticism consumers, high-quality online reviews, credible sources of online reviews, and a large quantity of online reviews are useful to help them minimize the perceived risks. Thus, merchants can encourage consumers to generate a large quantity of online reviews to attract more consumers and increase their purchase intention. However, for high skepticism consumers, this may result in negative outcomes (i.e., consumers' high level of perceived risk). Thus, an online review website could try to manage consumer reviews more effectively. For instance, it might retain only the most recent six months of online reviews generated by consumers. This may help decrease consumers' perception of risk, which may be triggered by a large quantity of online reviews. In addition, when consumers post online reviews, especially positive ones, merchants and online review websites can encourage them to add their photograph, which will improve the credibility of the sources of online reviews.

### **LIMITATIONS AND FUTURE RESEARCH DIRECTIONS**

This study is not without limitations. First, prior studies have demonstrated that the influence of online reviews may differ between platforms (Cheung & Thadani, 2012; Lee & Youn, 2009) and cultures (Hong, Thong, & Tam, 2004). Thus, future research could replicate this research model using different online platforms (e.g., e-commerce websites, online discussion forums) or other cultural contexts, to compare the results and generate more generalizable findings.

Second, this study focused on the effect of positive online reviews on consumers' purchasing behavior; the effect of negative online reviews was excluded to facilitate a simple research design.



Although it is believed that this survey-based approach is viable as most of the reviews online are positive, future studies could extend our understanding by including negative reviews to investigate whether the influence may differ between positive and negative reviews.

Finally, the respondents were asked to recall their recent experience about processing reviews on dianping.com, which may induce memory recall bias as indicated in prior research (Zhang et al., 2014). Thus, in future studies, experiments could be utilized to examine the effect of online reviews on consumer behavior or perceptions, which may help avoid this problem.

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## APPENDIX

Table 5. Instrument items

Constructs		Measurement Items
Argument quality (Bhattacharjee & Sanford, 2006; Li, 2015)	AQ1	These reviews provided relevant information about the restaurant
	AQ2	These reviews provided complete information about the restaurant
	AQ3	The arguments of these reviews were persuasive
	AQ4	The arguments of these reviews were convincing
Source credibility (Bhattacharjee & Sanford, 2006; Shen et al., 2016)	SC1	People who left these reviews were knowledgeable in evaluating quality of the food and restaurant
	SC2	People who left these reviews are experts in evaluating quality of food and restaurant
	SC3	People who left these reviews in Dianping.com were trustworthy
	SC4	People who left these reviews in Dianping.com are reliable
Perceived quantity of online reviews (Zhang et al., 2014)	PQR1	Many people had posted online reviews about the restaurant
	PQR2	The restaurant was very popular on Dianping.com
	PQR3	The restaurant had a large number of online reviews
Perceived risk (Glover & Benbasat, 2010)	PR1	The restaurant may not match the description in the reviews
	PR2	The restaurant recommended by reviews on this website will not meet my needs
	PR3	Finding and choosing a restaurant from this website will be too difficult and time consuming
	PR4	I may disclose my personal information when browsing reviews on the website, which will be misused.
Information usefulness (Bailey & Pearson, 1983)	IU1	The reviews on Dianping.com are valuable.
	IU2	The reviews on Dianping.com are informative
	IU3	The reviews on Dianping.com are helpful
Behavioral intention (Reimer & Benkenstein, 2016)		After reading the online reviews...
	BI1	I intended to visit the restaurant
	BI2	I planned to eat at the restaurant
	BI3	I would consider visiting this restaurant
	BI4	I would give this restaurant a try
Review skepticism (Skarmas & Leonidou, 2013)	RS1	I am basically doubtful about online reviews.
	RS2	Online reviews are often questionable
	RS3	I am generally uncertain about online reviews
	RS4	I am generally skeptical about online reviews.

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