

## The Impact of Negative Online Review on Consumer's Purchase Intention: A Dual-Process Perspective

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### Abstract

*Online review is an important reference for online consumer's purchase decision, among which the effect of negative online review is even greater. However, there is still a lack of attention on the impact of negative online review compared to positive one. Drawing on the dual-process theory, this study develops a research model to examine important factors affecting consumer's purchase intention, mainly focusing on negative online review. An online survey involving users of online shopping websites such as JD.com, Taobao.com and Amazon.cn is conducted to empirically test the proposed research model. The result shows that quality of negative review, as a systematic/central factor, is the primary factor affecting consumer's purchase intention, while heuristic/peripheral factors such as source credibility and quantity of negative review are also evaluated by consumer when making purchase decision. It is also examined that quality of negative review has a stronger impact on purchase intention when the consumer has a high self-efficacy level. Finally we discuss the theoretical and practical implications based on the findings.*

**Keywords:** *negative online review; consumer's purchase intention; dual-process theory*

### 1. Introduction

Word-of-mouth(WOM) is defined as “an interpersonal communication, about an organization or its products that is independent from the organization's marketing activities”[1]. Online review is a new form of WOM communicated via Internet, which has been extended to include far-ranging social communications mediated by information technology [2]. As online reviews contain rich information about attributes and qualities of products experienced by consumers themselves, it is able to lower the uncertainty of product information and risk of purchasing [3]. Online review is becoming influential in both guiding consumer decisions [4-5] and marketing for online merchants [6-7].

In online review systems, reviewers are usually required to rate for the contents or products to be evaluated (*e.g.*, one star is extremely negative, five star is extremely positive and three star for neutral) [8]. A number of prior studies posit that negative review is much more influential than positive one [9-10], and consumers tend to make decisions relying on negative review<sup>1</sup>[11]. However, compared to positive review, negative review is not well studied yet. Extant literatures on negative review mainly focus on the antecedences, impact of valence on its usefulness, and consumer's decision compared with positive review. There is a general lack of theoretical research on how negative review influence consumer's purchase intention and what factors moderate the influence. Because negative review can generate negative impact on consumer's purchase

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<sup>1</sup> All concepts of review in this study refers to online review.

intention, which further affects performance of online merchants, to investigate the impact of negative review on consumer's purchase intention is beneficial to better administration of negative review for online merchants and can provide foundation for marketing.

This work investigates the antecedents of online consumer's purchase intention in the context of negative review from a dual-process perspective, and we try to answer two key questions: 1) what are the systematic/central and heuristic/peripheral factors of negative review adopted for consumer's purchase intention?, and 2) how do these factors influence consumers at different level of self-efficacy? This work attempts to make contributions to both literatures on impact of negative review and provide implications for practitioners.

## 2. Literature Review

### 2.1. Online Review and its Impact

Literatures on online review can be classified into three levels: market level, individual level and technical level. Researches on market level mainly focus on whether review characteristics can affect market outcomes (*e.g.*, product sales, revenues and even share price) [7-13], while researches on individual level concern consumer's motivation to post online review and impact of online review on individual's decision-making [8-14]. Researches on technical level investigates techniques and methods for processing online review data, such as text mining, classification, automatic identification and so on [15-16]. This work falls onto the individual level and it is expected to find out how negative review may affect consumer's purchase intention.

According to information acceptance model, the characteristics of online review determine its usefulness, which further affects consumer's purchase intention. So the usefulness of online view has been a hot topic for online review researches, which attempt to answer questions such as "which review is more useful" [12] and "review posted by whom is more useful" [17], *etc.* For the first question, the content attributes are usually studied, including valence, words and expressions, length, extremeness, *etc.* [12-19]. Researches answering the second question are relatively fewer in number, which concern the source attributes of online review [17]. Nayloret al. [20] verified that similarity between reviewer and reader would positively influence the perceived usefulness of review. Factors such as the expert role, knowledge level and activeness would also be influential [21-22]. Previously proposed influential factors and characteristics of online review need to be considered and sifted in this work, due to their direct or indirect effects on consumer's purchase intention.

### 2.2. Negative Online Review

Online review consists of positive, negative, and neutral ones. Positive review motivates consumer's purchase behavior, while negative review commonly has negative impact on consumer's purchase decision [23]. Positive reviews are usually superior in quantity, however, as Chang's opinion [24], negative information has a greater and diagnostic effect on consumer purchase decisions than is the case with positive information, and negative review may exert stronger effects than positive one due to the asymmetric effects [18].

Generally, literatures on negative review mainly focus on two issues. 1) Motivations and reasons for consumers posting negative review: from the perspective of motivations, to post negative review may enable reviewers appeared to be intelligent and professional, and some reviewers can vent through criticism, so the motivations for posting negative reviews may be stronger [25-26]. 2) The positive/negative valence of online review: for example, Godes & Silva [27] and Moe [28] found downtrend of online review's valence over time. Actually, consistent conclusions have not been drawn yet about the effects of reviews with different valences. From the viewpoint of trust, Zhao [29] proposed that if

online review to be too positive, consumers might doubt its authenticity thereby lowered its usefulness. Mudambi [12] discovered that neutral online review could provide more objective information thus be more useful. Overall, few studies examined the influence of interaction between consumers and companies on negative review [30].

It is rather difficult to cope with negative review. As the transmission of negative review is often anonymous, with both truth and rumor confused, literatures on negative review are much fewer in number than positive review, and some researches restricted the analysis on positive online reviews to achieve simple designs [13]. In spite of this, the impact of negative review on consumer's purchase decision and further online merchant's marketing is undoubtedly nonnegligible, hence, it is necessary to make clear the influencing mechanism of negative review to consumer's purchase intention.

### 2.3. Dual-Process Model

During consumer processing online review, useful information can change one's attitude by persuasiveness, and conduct the purchase behavior to turn into sales. Dual-process theory is a valid framework in explaining the impacts of online reviews at the individual level [8]. Heuristic-systematic model (HSM) [31] and elaboration likelihood model (ELM) [32] are two prevalent dual-process models and have been widely adopted in the information persuasiveness of electronic WOM. In dual-process theory, the modes that people process information, establish validity assessments and later form decision outcomes are comprehensively investigated [33]. The mechanisms of HSM and ELM are similar. HSM posits that individual processes information in systematic way or heuristic way, while ELM indicates that the individual's attitude can be persuaded through two routes: central route and peripheral route. In systematic way and central route, high cognitive effort is made to elaborate information, while in heuristic way and peripheral route, heuristic and simple decision rules are adopted [34].

In the extant literatures, Park *et. al.*, [35] examined that the quality (central route) and quantity (peripheral route) of online reviews positively affect consumers' decisions. Zhang [36] presented that argument quality (systematic way) and source credibility (heuristic way) can influence the adoption of online reviews in online communities. Thompson [37] found that for consumers rich in cognitive resources, perceived information expertise is main factor affecting their attitude while for consumers lacking of cognitive resources perceived similarity with review is the main factor. Despite widely adopted in EC and IS fields, dual-process theory have not been investigated in depth aiming at negative review. In the context of negative review, questions such as "what factors are systematic/central", "which are heuristic/ peripheral", "what is the moderator between negative review and purchase intention", are still not clear in extant studies. We attempt to provide insights into these issues.

## 3. Theoretical Foundation and Model

### 3.1. Systematic/Central Factor

According to dual-process theory, systematic way in HSM or central route in ELM refers that "people consider all relevant pieces of information, elaborate on these pieces of information, and form a judgment based on these elaborations" [38]. If people have sufficient motivation, ability, and cognitive resources, they tend to choose systematic processing way or central route to process information [39]. In applications of dual-process theory, argument quality has been consistently identified as a systematic/central factor in persuasion process [40-41]. Argument quality refers to "the audience's subjective perception of the arguments in the persuasive message as strong and cogent on the one hand versus weak and specious on the other" [42]. Sussman [43] posited information quality to be an important antecedent of knowledge adoption in

organizations. It has also been shown that informative advertisements can lead to purchase behavior [44]. Therefore in the contrast, we expect that if a consumer finds the quality of negative review about a product to be stronger, the consumer's purchase intention may be lower. The following hypothesis is provided:

**H1. Quality of negative review negatively affects consumer's purchase intention.**

### **3.2. Heuristic/Peripheral Factor**

In dual-process theory, heuristic way in HSM and peripheral route in ELM mean that "people consider a few informational cues, or even a single informational cue" to form a judgment [45]. If the motivations, abilities, and cognitive resources of an information recipient are low, then he tends to process information in heuristic way or peripheral route [39]. As people are commonly economy-minded, heuristic way or peripheral route, which are contextually oriented towards the communication environment, might be default strategies in information processing due to the least effort principle [46]. In our work, we refer source credibility and quantity of negative reviews as main heuristic/peripheral factors.

#### **(1) Source Credibility**

Source credibility refers to a recipient's perception of the credibility of an information source [31], which is considered as an important peripheral cue in the informational influence process [43-47]. Although source credibility doesn't concern with the information content itself, it can play an important role in affecting consumer's purchase intention. As source credibility captures the perceived expertise and trustworthiness of review sources [47], it is plausible to infer that consumers will be more unlikely to purchase a product if the negative review is posted from a reputable source. The following hypothesis is expected:

**H2. Source credibility of negative review negatively affects consumer's purchase intention.**

#### **(2) Quantity of negative review**

When a consumer browsing products on an online shopping website, the quantity or proportion of negative review is an important cue to be concerned. As the concerning of "quantity of negative review" is not the substantial content of negative review, it is deemed as heuristic cue by principle. Referring to previous studies, we define quantity of negative review as consumer's perception regarding the volume or proportion of negative review. Park [48] and Sher [49] considered quantity of review as effective decision rule that helps consumer forming quick decision. Thus, we can expect that a consumer is more unlikely to purchase a given product if he perceives a high quantity of negative review, and the hypothesis can be drawn as:

**H3. Quantity of negative review negatively affects consumer's purchase intention.**

### **3.3. Moderating Role of Self-Efficacy**

According to ELM, individual's ability moderates his elaboration of information. If the individual's ability is relatively low, the peripheral route plays a role, and if the individual's ability is high, he will process information through central route [43,50]. Therefore, we bring forward the construct of self-efficacy to explore the moderating role of individual's ability. Self-efficacy refers to the perceived ability when individual performs activities to accomplish a desired task [51]. In the context of negative review, self-efficacy means the consumer's perceived ability of collecting, analyzing and using of information related to the negative review about a product.

As Marakas *et al.*, [51] argued, self-efficacy should be a multidimensional construct to be measured effectively. In general, the perceived self-efficacy will be higher if the individual's expertise is stronger and the extent of involvement is higher. Thus, we propose two dimensions of self-efficacy: expertise and involvement. We refer to expertise as the consumer's prior knowledge about the product and the negative review while involvement represents the personal relevance of the product and the review. Usually, individual with higher expertise and involvement will pay more attention on the content of information itself, so when facing with negative review, the consumer will perceive higher ability for analyzing and using information contained in the review, and then he will tend to choose central route to form decision via the quality of review due to his high self-efficacy. On the contrast, if the consumer's ability for processing negative review on product is insufficient, he will not be able to process the substantial content of negative review, but to concern on other factors such as reviewer, quantity of negative review, etc., due to the low self-efficacy, thus the peripheral route will inclined to be adopted to form judgment [34].

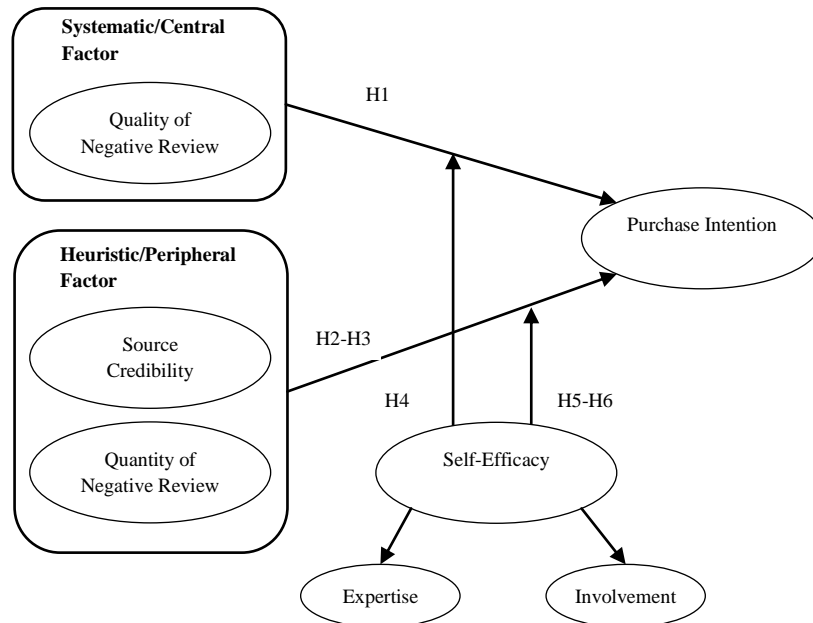
Based on analysis of moderating effects above, the following hypotheses are provided:

**H4: The negative effect of quality of negative review on purchase intention will be stronger for consumers with higher self-efficacy.**

**H5: The negative effect of source credibility of negative review on purchase intention will be stronger for consumers with lower self-efficacy.**

**H6: The negative effect of quantity of negative review on purchase intention will be stronger for consumers with lower self-efficacy.**

Figure 1 depicts the research model of this study.



**Figure 1. Research Model**

## 4. Methodology

### 4.1. Questionnaire Development

To examine the proposed research model, we developed an online survey questionnaire. Consumers who recently purchased products via online shopping websites

such as JD.com, Taobao.com and Amazon.cn in the past three months were invited. The survey instructions required each respondent to recall the most recent negative review he had read on the online shopping website about the product he was interested in, and then to complete the online survey questionnaire based on his perceptions at the time. The questionnaire was developed by adopting previously validated measures in the literatures, including quality of negative review [13-52], source credibility [13-53], expertise [43], involvement [54], purchase intention [55] and we develop measures for quantity of negative review. The survey took about 10 minutes to complete. All items used 7-point Likert scales (from strongly disagree to strongly agree). Some wordings of the items were slightly modified to adapt the negative review context. The measurement of constructs for the research is depicted in Appendix A.

#### 4.2. Data Collection

We distributed hyperlink of the questionnaire among potential eligible respondents. After a month of questionnaire distribution and collection, totally 228 recipients responded to the survey. After discarding invalid responses, 201 responses were included in the data analysis. Table 1, shows the demographic characteristics of the sample.

**Table 1. Demographic Characteristics**

		Number	Frequency
Gender	Male	89	44.3%
	Female	112	55.7%
Age	<22	13	6.47%
	22-26	109	54.23%
	27-31	55	27.36%
	>31	24	11.94%
Education	High school or below	20	10.0%
	University	148	73.6%
	Postgraduate or above	33	16.4%
Annual Income	<20000	13	6.5%
	20001-60000	94	46.8%
	60001-100000	71	35.3%
	>100000	23	11.4%

As shown in Table 1, 55.7 percent of all respondents were female and 44.3 percent were male. 81.59 percent of participants were aged from 22 to 31, 93.5% had incomes of above 20000 RMB per year. 90.0% had university or above degrees.

### 5. Data Analysis

#### 5.1. Measurement Model

SPSS 22.0 is employed to perform reliability analysis for the collected data, and AMOS 22.0 is employed to perform confirmatory factor analysis to assess the validity of the constructs. Table 2 listed the values of Cronbach's Alpha, factor loading, Average Variance Extracted (AVE) and Composite Reliability (CR). As shown in Table 2, Cronbach's Alphas of all constructs are above 0.8 with significance  $p < 0.001$ . The CR values of all constructs range from 0.844 to 0.903, which are above the recommended benchmark of 0.7. The AVE values of all constructs ranged from 0.660 to 0.729, which are above the recommended level of 0.5. It indicates the measurement model's convergent validity to be satisfactory.

**Table 2. Measurement Validity Assessment**

Construct	Item ID	Factor Loading	Cronbach's $\alpha$	AVE	CR
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Quality of Negative Reviews (QLNR)	QLNR1	0.777	0.886	0.660	0.886
	QLNR2	0.833			
	QLNR3	0.830			
	QLNR4	0.808			
Source Credibility (SC)	SC1	0.809	0.901	0.700	0.903
	SC2	0.861			
	SC3	0.794			
	SC4	0.879			
Quantity of Negative Reviews (QTNR)	QTNR1	0.807	0.843	0.643	0.844
	QTNR2	0.786			
	QTNR3	0.812			
Expertise (EXP)	EXP1	0.813	0.853	0.661	0.854
	EXP2	0.829			
	EXP3	0.797			
Involvement (INV)	INV1	0.834	0.863	0.677	0.863
	INV2	0.820			
	INV3	0.815			
Purchase Intention (PI)	PI1	0.860	0.894	0.729	0.895
	PI2	0.827			
	PI3	0.891			

To examine the discriminant validity of the measurement model, we can compare the square root of the AVE values of constructs with the correlations between them. Table 3 shows the result of discriminant validity test. The square root of the AVE value for each construct is above the correlation between the construct and other constructs, which means the discriminant validity of the measurement model to be satisfactory.

**Table 3. Result of Discriminant Validity tTst**

	QLNR	SC	QTNR	EXP	INV	PI
QLNR	<b>0.812</b>					
SC	0.674	<b>0.834</b>				
QTNR	0.282	0.448	<b>0.802</b>			
EXP	0.448	0.398	0.301	<b>0.813</b>		
INV	0.376	0.383	0.263	0.765	<b>0.823</b>	
PI	-0.648	-0.649	-0.563	-0.469	-0.455	<b>0.854</b>

The value in the diagonal line of the table is the square root of AVE.

We utilize variance inflation factor (VIF) to evaluate the potential issue of multi-collinearity between different constructs. According the results in SPSS 22.0, the VIFs of constructs range from 1.286 to 2.631, which are all below the benchmark of 10, suggesting that the multi-collinearity does not seriously threaten the analysis.

### 5.1. Hierarchy Regression Analysis

Hierarchy regression analysis is employed to test the proposed hypotheses. Table 4 depicts the result of hierarchy regression analysis with consumer's purchase intention as dependent variable. Model 1 examines the influence of all independent variable on purchase intention (H1-H3). In Model 2, self-efficacy is introduced based on Model 1. On the basis of Model 2, Model 3a-3c adds an interaction item between self-efficacy and one independent variable (QLNR, SC, QTNR) respectively to reflect the moderate role of self-efficacy (H4-H5). All independent and moderating variables are mean-centered before producing the interaction terms to minimize potential multi-collinearity.

**Table 4. Result of Hierarchy Regression Analysis**

	Model 1	Model 2	Model 3a	Model 3b	Model 3c
Block 1:					
Main effect					
QLNR	-0.398***	-0.352***	-0.349***	-0.364***	-0.350***
SC	-0.223**	-0.200**	-0.182**	-0.199**	-0.198**

QTNR	-0.351***	-0.327***	-0.343***	-0.319***	-0.321***
SE		-0.155**	-0.173**	-0.145**	-0.145**
Block 2: Moderating effect					
QLNR*SE			-0.129**		
SC*SE				0.093*	
QTNR*SE					0.124**
Adjusted R2	0.594	0.610	0.625	0.617	0.624
F value	98.477	79.324	67.613	65.427	67.363

Note: \*p<0.05; \*\*p<0.01; \*\*\*p<0.001.

Model 1 suggests that all dependent variables have significantly negative impacts on PI, among which the QLNR generates the greatest impact ( $b = -0.398, p < 0.001$ ). In Model 3a, positive moderating effect of SE on the relationship between QLNR and PI is observed ( $b = 0.093, p < 0.05$ ). From Model 3b, it is identified that SE negatively moderates the relationship between SC and PI ( $b = -0.093, p < 0.05$ ). Model 3c shows a significantly negative moderating role of SE on the relationship between QTNR and PI ( $b = -0.124, p < 0.01$ ). Thus, all hypotheses for the main and moderating effects are supported.

As self-efficacy has different moderating effects on the relationship between systematic/central factor or heuristic/peripheral factors and consumer's purchase intention. The two-way interaction graphs for the interaction effects are displayed in Figure 2-4.

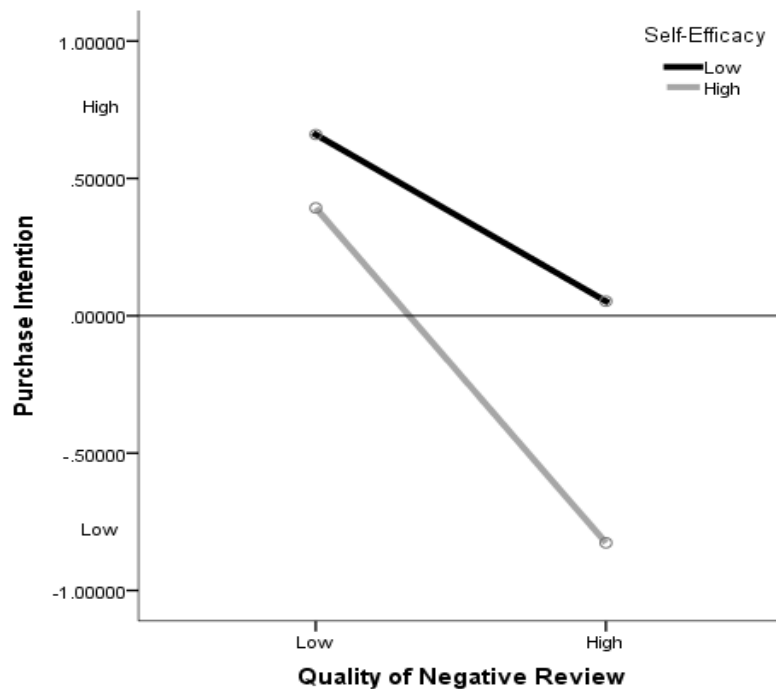
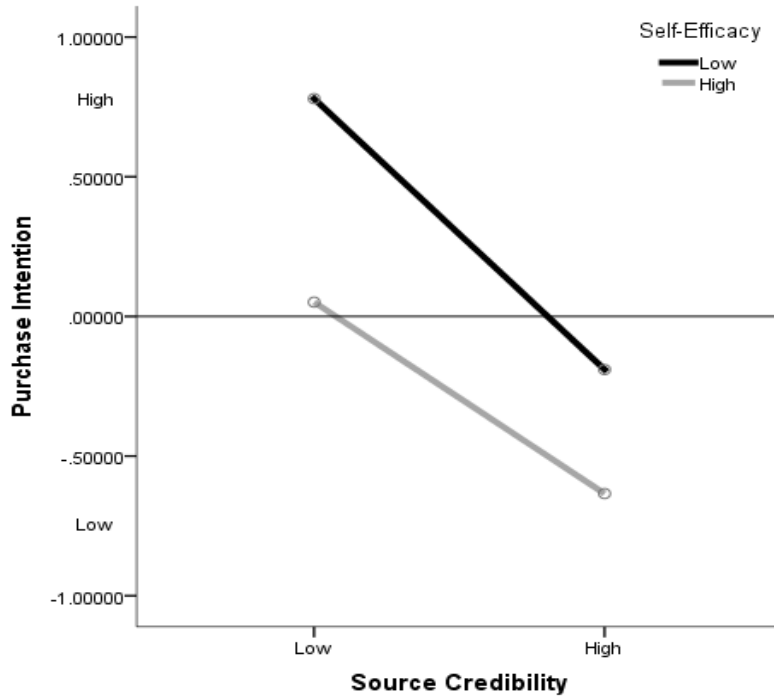
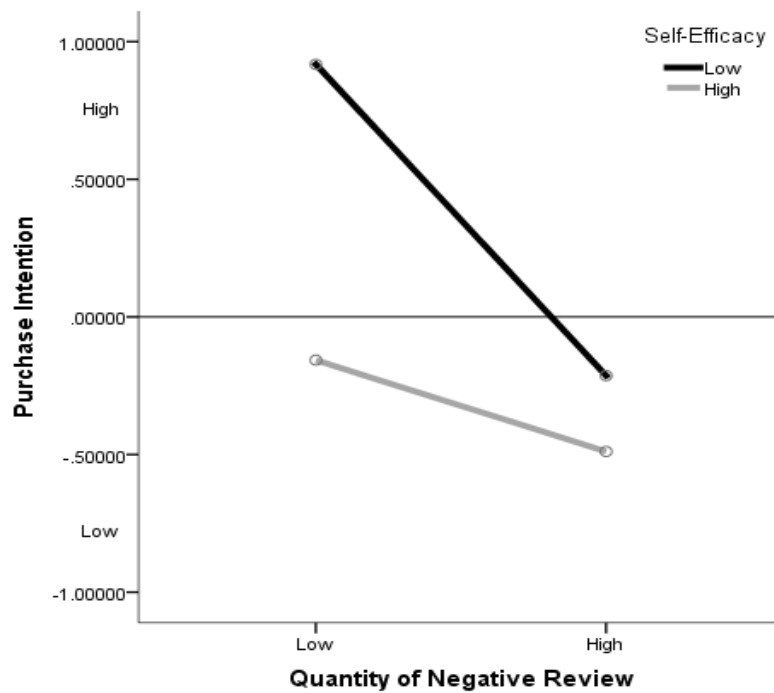


Figure 2. Purchase Intention Impact of Quality of Negative Review





**Figure 3. Purchase Intention Impact of Source Credibility**



**Figure 4. Purchase Intention Impact of Quantity of Negative Review**

In Figure 2, interaction effect of self-efficacy and systematic/central factor (quality of negative review) shows the positive moderating role of self-efficacy, and in Figure 3-4, interaction effects of self-efficacy and heuristic/peripheral factors (source credibility and quantity of negative review) demonstrate the negative moderating role of self-efficacy. Hypotheses of H4-H6 are further supported.

## 6. Discussions and Conclusions

In this paper we provide insights into impact of negative online review on consumer's purchase intention from a dual-process perspective. Specifically, we examine the systematic/central and heuristic/peripheral factors that can affect consumer's purchase intention, and the moderating role of self-efficacy. Our empirical findings support the view that both the systematic/central factor (quality of negative review) and heuristic/peripheral factors (source credibility and quantity of negative review) have significantly negative effect on the purchase intention of consumers, among which the quality of negative review is the most influential factor. In addition, self-efficacy positively moderates the impact of systematic/central factor on consumer's purchase intention and negatively moderates the impact of heuristic/peripheral factors. If the self-efficacy of a consumer is high, he will make decision mainly relying on quality of negative review, while those consumers with low self-efficacy may refer to source credibility and quantity of negative review associated with online review to facilitate their purchase decision-makings.

### 6.1. Implications

The findings of this study not only provide new insights into the impact of negative online review literatures but also generate some practical implications.

#### (1) Theoretical implications

To simplify research designs, a number of literatures only took positive online review into considerations. This work is designed to investigate the impact of negative online review. We introduce dual-process theory, a general theory on information processing and informational influence, into the context of negative review, and provide research model including systematic/central factor, heuristic/peripheral factors and moderator affecting consumer's purchase intention. We introduce quantity of negative review as a heuristic/peripheral factor, which is empirically examined to be significantly influential on consumer's purchase intention. The characteristic of negative review is much more complex than positive one, and it has different impacts towards different consumers. This work contributes to the literatures by unveiling the roles of different negative review factors at different levels of the consumer's self-efficacy. It is notable that although the impact of quality of negative review is greatest among all factors affecting consumer's purchase intention (quality of review has also been examined as most influential factor in many positive online review context), the impact of quantity of negative review is very close to that of quality of negative review. It shows that in the context of negative online review, the quantity is also an important factor worthy of attention.

#### (2) Practical implications

Negative review on online shopping website has attracted growing attentions by both online merchants and consumers. As quality of negative review is examined as the strongest determinant of consumer's purchase intention, negative review of high quality with supportive evidence and explanations need to be especially addressed by online merchants. On one hand, to improve the product according to the description of negative review, while on the other hand to post timely and detailed reply and explanation below the negative review may be effective strategies to reduce the negative effects. Because source credibility significantly affects consumer's purchase intention, if consumer with high reputation or ranking posts negative review, responses should be performed with high priority. As quantity of negative review is a concerned factor, online merchants should monitor the quantity and proportion of negative review in time, and make efforts to reduce negative reviews by means of improving product quality, customer care and timely response, as thus to enhance brand's satisfaction and promote product sales.

## 6.2. Limitations and Future Research

Despite of theoretical and practical implications of this study, there still exist certain limitations. Firstly, the negative reviews adopted are limited to what were read by consumers on online shopping websites. There are some professional third-party online review platforms (*e.g.*, Epinions.com, Dianping.com) with a huge number of online product reviews, and the generalizability of our findings to the context of third-party online review platforms needs to be examined. Besides, the influence of different cultural backgrounds, control variables, and product types are to be considered. Secondly, the research model explains 59.4% of variances in purchase intention, which suggests some unveiled important predictors exist. The missing factors may include perceived ease of use of online review system, consistency of negative online reviews, etc. Therefore, a better explanatory research model incorporating more important factors can be expected. Finally, as measurement performed in this study is based on respondents' self-reporting recall of recently read negative review, the objectivity and accuracy need to be improved in future studies.

## Conclusions

Online review is an important form of user-generated-content, and provides helpful information for consumer's online purchase decision. Negative online reviews deserve special attention due to their stronger effects on consumers' behaviors and product sales than positive ones. This study investigates the systematic/central factor as quality of negative review and heuristic/peripheral factors as source credibility and quantity of negative review essential to drive consumer's purchase intention, from a perspective of dual-process theory. It is verified that consumer's self-efficacy plays a moderating role affecting dual-process factors being adopted. We expect the findings of this work can both theoretically supplement extant negative online review literatures and practically provide feasible implications for online consumers and merchants to better process online reviews, improve online view systems, and build brands.

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## Appendix

### A. Measurements of constructs

Construct	Item
Quality of Negative Reviews	(Adapted from Zhang, 1996; Zhang 2014) 1. This review arguments are strong. 2. This review arguments are persuasive. 3. This review provide sufficient information about the goods. 4. This review provide timely information about the goods.
Source Credibility	(Adapted from Berlo, 1969; Zhang, 2014) 1. People who left this review is knowledgeable. 2. People who left this review is expert. 3. People who left this review is highly rated in the website. 4. People who left this review is trustworthy.
Quantity of Negative Reviews	1. There exist many similar negative reviews about the product. 2. To what extent do you perceive the proportion of negative reviews about the product. 3. Many people posted negative review about the product.
Expertise	(Adapted from Sussman, 2003) 1. How informed are you on the subject matter of this review.

	2. To what extent are you an expert on this review topic. 3. To what extent are you knowledge on this review topic.
Involvement	(Adapted from Zhang, 2004) 1. I was greatly involved in the topic of this review. 2. It was important for me to get information from this review. 3. I am interested in this review topic.
Purchase Intention	(Adapted from Gilly, 1998) 1. I intend to buy the product. 2. I am interested in the product. 3. I will buy this product in priority among similar products.

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