

HOW DISPERSIVE OPINIONS AFFECT CONSUMER DECISIONS: ENDOWMENT EFFECT GUIDES ATTRIBUTIONAL INFERENCES

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Abstract

Electronic word-of-mouth (eWOM) dispersion, reflecting the extent of reviewers' opinion divergence regarding a product, determines consumer decisions. Drawing upon the endowment effect and attribution literature, this research proposes that the endowment effect mediates the influence of eWOM dispersion on attributional inferences, and the display formats of eWOM dispersion ("horizontal bar chart" vs. "eWOM content") moderate the mediating influence of endowment effect on attributional inferences of eWOM dispersion. Three complementary studies reveal three key insights in this setting. First, when consumers already having an emotional attachment to a product and subsequently encountering dispersive eWOM, the higher the level of eWOM dispersion, the stronger the endowment effect. Secondly, In such circumstance, the stronger endowment effect promotes more reviewer-related attribution inference of high-dispersion eWOM, and the weaker endowment effect promotes more product-related attribution inference of low-dispersion eWOM. Third, the positive influence of eWOM dispersion on endowment effect is stronger for eWOM dispersion in the complexity or disfluency display format (i.e. "reviewers' impression of product") than for eWOM dispersion in the simply of fluency display format (i.e. "horizontal bar chart"), more importantly, the mediating influence of endowment effect on attributional inferences is moderated by the display formats of eWOM dispersion, and this findings persists even when product category (hedonic vs. utilitarian) is taken into consideration. The theoretical implications for the eWOM dispersion and attribution literature and practical implications for online retailers are discussed.

Key words: Electronic word-of-mouth dispersion; Endowment effect; Attributional inference; Display format; Product category.

1. Introduction

In an online survey of 5,000 shoppers across five countries, Cisco Internet Business Solutions Group (2013), surveyed participants to indicate the three most important sources of information they use for making purchase decisions (Floyd et al. 2014). The survey shows that electronic word-of-mouth (eWOM) on retailer websites (52%) was included among the top three sources of information most frequently utilized by respondents—ahead of advice from friends and family members (49%) and advice from store employees (12%). In view of this, due to the sheer number of reviews available, online retailers have tried to make the eWOM user-friendly by summarizing eWOM in the form of graphs or bar charts for clarifying the rating distribution of previous buyers (Hu et al. 2017). However, whether in the online or offline environment, the messages/information conveyed, by perhaps thousands of strangers via eWOM may not be consistent, and the extent to which their opinions vary may be extreme (Langan et al. 2017). This dispersion, as the range or spread of opinions showing disagreement about a particular product, is most noticeable in the online environment given the prevalence of eWOM (He and Bond 2015; Hu et al. 2017). Retailers actually believe that eWOM dispersion means much more risk and uncertainty for prospective consumers (He and Bond 2015; Wang et al. 2015), and consumers normally prefer products with consistent eWOM (Li 2018). Therefore, they usually tend to pursue products with ratings of five/ten stars (highly praised by all reviewers) by offering reviewers coupon codes or other incentives. The real practice, however, tells that the distribution of ratings is often

highly dispersed with a J-shape or unimodality rather than consistently (Hu et al. 2017).

The problem reflected in practice has attracted continuous research endeavors devoted to understanding the relationship between consumer decisions and eWOM dispersion, and further developing positive interventionary measures to influence the manner in which eWOM dispersion is interpreted (Sun 2012; Li 2018). Previous studies have focused on understanding the relationships between eWOM dispersion and product revenues (Chintegunta et al. 2010; Moon et al. 2010), product sales (Clemons et al. 2006; Zhu and Zhang 2010; Moe and Trusov 2011; Sun 2012; Wang et al. 2015), product decisions (Moon et al. 2010; He and Bond 2015; Langan et al. 2017), and other possible outcomes (e.g. eWOM ratings, Bae and Lee 2011; Moe and Trusov 2011; Guo and Zhou 2016), and the results have suggested more on the positive, negative or non-dispersal effect, which somehow indicate a contradiction.

Studies applied reference dependency theory to understand the moderation of average rating (Sun 2012), used the information-diagnostic theory to argue that additional information will be critical when eWOM is highly dispersive. The moderation of the product-related factors (e.g. product nature, product type, taste similarity, Bae and Lee 2011; He and Bond 2015; Langan et al. 2017) and the moderation of the reviewer-related factors (i.e. reviewer characteristics, Wang et al. 2015; Guo and Zhou 2016) have also been examined.

In spite of its importance, the effect of mediators is understudied, and indeed, how divided opinions are interpreted by consumers was rarely examined until the work which proposed an attribution-based model, originating from the affirmation that consumers who have noticed the eWOM dispersion will be involved in the process of

attribution to clarify it (He and Bond 2015). According to their work, the attribution-based model suggests that attributional inferences about eWOM dispersion are related to either reviewer causality or product causality, and different attributional inferences would incur positive or negative influences on product sales (He and Bond 2015). Although the function of eWOM which is related to a product indicates the degree of a product's performance in accordance with an indicator of what is promised or expected (Laczniak et al. 2001), different individuals judge the same product differently, which highlights the possible factor variation of reviewers making a contribution to a ranking distribution (He and Bond 2015). Therefore, for high eWOM dispersion, product-related attribution is negatively correlated with consumer decisions, whereas reviewer-related attribution reflects variability in reviewers' preferences or expectations and makes the dispersion markedly less negative (He and Bond 2015; Guo and Zhou 2016). Therefore, it is valuable for retailers, who facing with dispersive eWOM about their products, to know how to promote consumers to attribute the presence of WOM dispersion to reviewer causality than product causality.

In this work, we aim to further explore the mechanisms of eWOM dispersion on attributional inferences in the e-retailing settings. First, in most existing researches, consumers are set to have the active motivation to incorporate eWOM dispersion into product decisions (e.g., Bae and Lee 2011; Sun 2012; He and Bond 2015; Wang et al. 2015; Langan et al. 2017), therefore, they overlook the potential role that essential preconditions play in the effects of eWOM dispersion on related outcomes, specifically, prior researches which propose that consumers have the active motivation to make attributional inferences of eWOM dispersion are overlook the pre-situational factors

that mediate the impact of eWOM dispersion on attributional inferences (He and Bond, 2015). Ignoring the pre-situational factors could lead to severe biases in estimating the effects of eWOM dispersion. Therefore, by introducing the discussion of the pre-situational factors, we propose and test the mediation mechanisms between the eWOM dispersion and attributional inferences. Secondly, eWOM dispersion in prior studies, mostly displayed with the horizontal bar chart, which usually depicts an ‘overall’ rating scale attempting to integrate both positive and negative opinions with a single number (e.g. Zhu and Zhang 2010; Moe and Trusov 2011; Sun 2012; He and Bond 2015). As a result, many existing studies focus on the moderation effects of product factors, reviewer factors and eWOM elements (e.g. central tendency and volume), little attention has been paid on the moderation effect of physical display formats of eWOM dispersion. In fact, unlike Amazon.com and some online retailers which only use a five-star horizontal bar chart, many other major retailers, such as JD Mall (jd.com) and Taobao (taobao.com), adopt different formats to display eWOM dispersion. Thus, we examine the moderating effect of the display formats of eWOM dispersion on the impact of eWOM dispersion on attributional inferences.

We conduct three complementary studies in multiple categories of products (book, apparel, movie, and smartphone). The results are highly consistent and provide two theoretical contributions: First, we firstly summarize the precondition of consumers’ attributional inferences of eWOM dispersion. Specifically, before incorporating eWOM dispersion into attributional inferences, consumers need to browse and explore product information about a product and experience an emotional attachment to it. In situations where consumers have developed an emotional

attachment to a product, but end up finding that its eWOM is dispersive and presents largely divided opinions, they may experience a strong sense of loss. In this paper, this sense of loss is delineated by the endowment effect, and we operationalize the endowment effect as the increment in product value to consumers who have developed an emotional attachment to the product before versus after they encounter eWOM dispersion (Schurr and Ritov 2014; Walasek et al. 2018). Thus, our studies show that the stronger endowment effect promotes more reviewer-related attributional inference of eWOM dispersion when consumers already having an emotional attachment to a product and subsequently encountering high-dispersion eWOM (Studies 1 and 2).

Second, this study advances understanding of the display format of eWOM dispersion, and gives support to prior studies focusing on the different characteristics of the eWOM display formats in affecting consumer decisions (Stone et al. 2003). Specifically, we explore eWOM dispersion in terms of both its statistical and practical significance, represented by displaying “horizontal bar chart” versus “reviewers’ impression of product” respectively. The findings suggest that the positive influence of eWOM dispersion on endowment effect is stronger for eWOM dispersion in the complexity or disfluency display format than for eWOM dispersion in the simply or fluency display format, regardless of whether the role of product category is considered (Study 3). More importantly, the mediating influence of endowment effect on attributional inferences is moderated by the display formats of eWOM dispersion (Study 3).

In the following sections, we first review the literature that leads to the theoretical framework and four

research hypotheses, and then we present empirical studies that tested these hypotheses. Finally, we present the theoretical and managerial implications, followed by the limitations and future research directions.

2. Conceptual Development

2.1 Effects of eWOM dispersion and the attribution-based model

Continuous research endeavors have focused on understanding the relationship between eWOM dispersion and consumer decisions (i.e., sales; revenues; satisfactions) (Table 1 illustrates representative studies). Previous researches on the relationship between e-WOM dispersion and consumer decisions have focused more on the positive, negative or non-dispersal effect of e-WOM on purchasing behaviors. For example, Chintagunta et al. (2010) developed the influence of e-WOM dispersion on box-office performance to evaluate the designated market area (DMA)-level and ultimately providing product rollout strategies for future. In a two-level empirical analysis, Moon et al. (2010), considering the different characteristics of film quality such as film cost, etc., strove to understand the relationship between product ratings and product financial performance. According to some scholars, consumers tend to regard the distribution ratings of other people as the reflection of the potential outcomes that those previous consumers have actually experienced (Laczniak et al. 2001). So, the higher dispersion reflects on the extreme opinions and the higher risk (Moon et al. 2010; Zhu and Zhang 2010). On contrast, a few researchers hold that higher dispersion creates opportunities for consumers to feed their curiosity about their priorities when consuming, that is, to use it as an opportunity for learning (Moe and Trusov 2011).

Moreover, for providing integrated understandings for these findings, researchers apply various theories to systematically explain consumers' purchase decisions of eWOM dispersion, such as to apply reference dependency theory to highlight the aversion principle, to analyse the effect of moderation of average rating, and to explain that consumers prefer to products with consensus (less than dispersive e-WOM) (Sun 2012). Beyond that, some scholars use the information-diagnostic theory to argue that additional information would be critical when eWOM was highly dispersive. Such additional information includes product-related factors, such as the moderation of the product nature (Langan et al. 2017) / product type (Bae and Lee 2011) and brand equity (Langan et al. 2017), and reviewer-related factors, that is, the moderations which come from the variance of critic reviews (Wang et al. 2015) and the subsequent reviewer characteristics (Guo and Zhou 2016).

Meanwhile, another stream of research addresses attribution theory to explore the causes why consumers attribute integrated opinions to reviewers and e-WOM approval options. Since prior researches pointed to the fact that the attribution theory is particularly helpful for understanding consumers' perceptions of cause-and-effect relationships and attributional inferences substantially influence consumer satisfaction and drive most purchasing decisions (Tsiros et al. 2004). From this perspective, He and Bond. (2015) pioneeringly proposed that one particularly important mechanism that may mediate linkages between eWOM dispersion and product evaluations is the process of attribution inferences. And the attributional inferences about eWOM dispersion were related to either the product causality or the reviewer causality. Most importantly, different attributional inferences would incur positive or

negative influences on product sales: for high eWOM dispersion, attribution of consumers towards the product is negatively correlated with product decisions; simultaneously, attribution of consumers towards the reviewer reflects on the belief of consumers about the likelihood of linkage between variability and preferences or expectations of the reviewers, thereby making the dispersion less negative for online shoppers. Furthermore, they developed an e-WOM dispersion mediated-moderation model, in which consumer attribution inferences of WOM dispersion depends on the moderating effect of product domains (taste-similar vs. taste-dissimilar) .

In sum, although discussion from the perspectives of prior theories have provided a possible account on the complex role of e-WOM dispersion, further investigation is still needed to discuss, for the following reasons:

First, in existing researches, online shoppers are set to have the active motivation to incorporate eWOM dispersion into their decisions (e.g., Sun 2012; Wang et al. 2015; Guo and Zhou 2016; Langan et al. 2017). In practice, however, consumers may feel a certain level of emotional attachment to a given product (Dhar and Wertenbroch 2000), and then have the motivation to learn about eWOM dispersion into product decisions, or they may not be interested in the product and may lack enthusiasm for eWOM dispersion (Carmon et al. 2003; He and Bond 2015). Thus, the degree of salience that consumers will actively incorporate eWOM dispersion into product decisions are worthy of attention.

Furthermore, unlike theories based on reference-dependence and information diagnostics, the attribution theory provides a mediating perspective on consumer perception and interpretation of eWOM dispersion (as shown in Figure

1). However, the conceptual framework considered by He and Bond (2015) was also founded on the notion that consumers would actively process eWOM dispersion (He and Bond 2015; Bae and Lee 2011), and they overlooked the pre-situational factors needed for attribution inferences of eWOM. Without the function of the pre-situational factors, consumers may lack the propensity to make attributional inference about eWOM dispersion. Therefore, the discussion on the significance of eWOM in consumers' information reference can transition to that on the pre-situational factors for consumers' attributional inference about eWOM. Such investigations can increase the level of significance of the established discussion concerning the attributional inference about eWOM dispersion and will supplement the extant eWOM dispersion literature with the prerequisites for consumers' reference to eWOM. Building upon the established research conclusion about attribution choice, this research adopts attributional inference about eWOM dispersion as the dependent variable, thereby exploring its pre-situational factors.

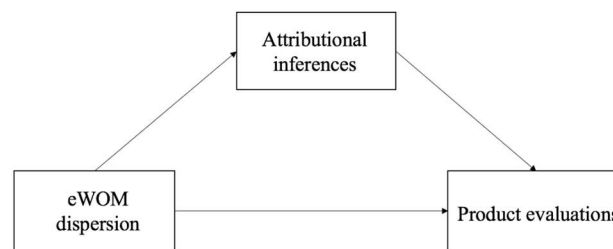


Figure 1 The Attribution-based Model of eWOM Dispersion (He and Bond 2015)

Secondly, existing literature has highlighted the moderating roles of product/service (He and Bond 2015; Langan et al. 2017), review properties (Sun 2012; Guo and Zhou 2016; Langan et al. 2017), and reviewers' characteristics (Wang et al. 2015; Guo and Zhou 2016) in affecting the effects of eWOM dispersion on possible

outcomes. Yet, very limited attention has been paid to explain how physical characteristics of the eWOM display formats may influence consumers' process of eWOM dispersion and product decisions. eWOM distributions considered in previous studies were displayed with a horizontal bar chart (e.g. He and Bond 2015; Wang et al. 2015; Langan et al. 2017), which usually depicted an 'overall' rating scale attempting to integrate both positive and negative opinions with a single number. However, many online retailers adopt different format to display eWOM dispersion. Studies suggested that different physical characteristics of the WOM distribution display may have a role to play in affecting WOM dispersion through impacting consumers' perceptions on WOM dispersion (Stone et al., 2003; Newmwan and Scholl, 2012). Accordingly, this research draws from past studies and current common practice in eWOM to uncover a previously overlooked moderating influence exerted by the retailing platform—the display format of eWOM dispersion.

Table 1 Prior research on the Effect of eWOM Dispersion

Reference	Product category	Dependent variable	Moderator	Mediator	Effect of eWOM dispersion on dependent variables	Addressed		
						The degree of salience that consumers will actively incorporate eWOM dispersion into product decisions	the discussion of different display formats of eWOM dispersion	Approaches on the basis
Clemons et al. (2006)	Beer	Sales growth rate	×	×	Positive effect on the sales growth of new product	×	×	×
Moon, Bergey, and Lacobucci (2010)	Movie	Movie revenues and consumer satisfaction	×	×	Negative effect on movie revenues	×	×	×
Zhu and Zhang (2010)	Video games	Game sales	×	×	Negative effect on game sales	×	×	×
Chinfegunta et al. (2010)	Movie	Box office revenues	×	×	No effect on box office revenues	×	×	×
Moe and Trusov (2011)	Bath, fragrance and beauty product	Cross-product temporal variation in sales and ratings	×	×	Positive effect on sales Negative effect on extreme ratings	×	×	×
Sun (2012)	Books	Book sales rank	Average ratings	×	Negative effect with high average ratings; Positive effect with low average ratings	×	×	Reference-dependent theory: consumers prefer products with consensus (less than dispersive eWOM)
Wang et al. (2015)	Movies, books, digital products	Product sales	the variance of critic reviews	×	Positive interaction with dispersion of third-party platform critic ratings	×	×	Information-diagnostic theory: given the low level of diagnosticity, information with a high eWOM dispersion exacerbates the uncertainty and risks of the online shopping environment.
Guo and Zhou (2016)	Restaurants	Restaurants' subsequent ratings	Subsequent reviewer characteristics	×	Negative effect ⁺ negative interaction with high connection among reviewers; negative interaction with high reviewer professionalism	×	×	
Langan et al. (2017)	Laptops, SLR cameras	Purchase intention	Product nature (hedonic product vs. utilitarian product); brand equity	×	Negative interaction with physical attributes; positive interaction with low average ratings; negative interaction with high brand value	×	×	
Bae and Lee (2011)	Digital cameras, Movies	Consumers' perceived credibility of a review	Product type (search product vs. experience product); online community (marketer-developed vs. consumer-developed)	×	Reviews from an online community are perceived to be the most credible for consumers seeking information about an experience product.	×	×	
He and Bond (2015)	Desk lamps, flash drives, framed paintings, music albums, and ice cream	Product evaluations	Product domain (taste similar vs. taste-dissimilar)	Attribution inferences (product causality vs. reviewer causality)	For high eWOM dispersion, attribution to product causality is negatively correlated with consumer decisions, whereas attribution to reviewer causality makes the dispersion markedly less negative	×	×	Attribution-based theory: the negative impact of eWOM dispersion on product evaluation can be mitigated when attributed to reviewer-related causes rather than product-related causes.
Our study	Books, apparel, smartphones, and movies	Attribution inferences of eWOM dispersion	The display formats of eWOM dispersion (horizontal bar chart vs. reviewers' impression of product)	Endowment effect (strong vs. weak)	Positive effect by the mediation of strong endowment effect; positive effect with the display format in 'reviewers' impression of product'	✓	✓	Endowment effect theory: endowment effect will prompt consumers to make positive attribution inference, and then mitigate the negative effect of eWOM dispersion on product decision

2.2 eWOM dispersion and endowment effect

Since so far no pre-situational factors have empirically proven predictive of consumers' attribution inference to eWOM, we conducted an open-ended survey on a professional online research platform (wjx.cn) among 157 consumers with online shopping experiences (64 females; mean age = 29.33, SD = 1.82). The survey included two questions: "Do you refer to product eWOM when shopping online?" and "In what situations will you definitely refer to product eWOM?" We coded the raw data with tags, which were respectively assigned to answers with identical or similar content. Tags with greater frequencies indicated the greater representativeness. The survey results showed that all participants had at some point referred to eWOM. Participants' statements regarding situations where they will definitely refer to eWOM are summarized in Table 2.

Table 2 Summary of Descriptions of Situations in which Consumers Will Definitely Refer to eWOM

Open coding	Preliminary coding	Raw data (N indicates the number of times mentioned by participants ≥ 30)
Fondness for product	I refer to eWOM when I am fond of a product after browsing its descriptions.	e.g. "The product on pictures seems good and I want to know previous consumers' reviews about the product" (N=93); "I like the product and intend to purchase it" (N=102).
Fondness for product Product category	I refer to eWOM when I am fond of a product that falls within certain category.	e.g. "I am fond of the product and considering to purchase the product, and it can influence my appearance and attire" (N=62).
Fondness for product Product price	I refer to eWOM when I am fond of a product that is priced at a certain level.	e.g. "The product seems so great, according to its descriptions, that I intend to purchase it, but its price is much lower than the market price" (N=41).
Fondness for product Product familiarity Brand familiarity Store familiarity	I refer to eWOM when I am fond of a product but my familiarity with the product/brand/store necessitates more information.	e.g. "I intend to purchase the product, but I am not familiar with the brand/ have never been exposed to this brand" (N=71); "I am fond of the product and want to purchase it, but I have never purchased anything from the store" (N=48).
Fondness for product Product quality	I refer to eWOM when I am fond of a product of which I want to know more about quality.	e.g. "The product seems good in all aspects, according to descriptions, but I am not sure about its quality and actual performance" (N=93).

Based on the coding of raw interview data, the precondition of consumers' reference to eWOM is that they need to browse and explore product information and then become fond of the product (emotional attachment). Meanwhile, consumers' decisions to refer to eWOM are also to some extent dependent on product category, quality, price, brand familiarity, and store familiarity. However, given that these factors are considered in combination with

emotional attachment to product, we decided to focus our attention on consumers' emotional attachment to product.

In this respect, if a consumer encounters mixed dispersive eWOM of a product (uncertainty) after developing an emotional attachment to the product, will the above pre-situational factor influences the subsequent attributional inference about eWOM dispersion?

Indeed, the existing literature has provided indirect evidence supporting our speculation. Research has shown that by browsing and exploring product information, consumers gradually grasp the strength and features of the product, and, therefore, develop an emotional attachment to it (Dhar and Wertenbroch 2000). In such circumstances, even if consumers do not actually own the product, by imagining and anticipating product use experience, they can still feel a sense of pre-factual ownership (Carmon et al. 2003), which is a state of feeling ownership of the product prior to actual purchase (Epstude et al. 2016). Furthermore, if consumers already having an emotional attachment to a product and then encountering dispersive eWOM, the uncertainty and risks represented by dispersive eWOM will transform the sense of possessing the product due to pre-factual ownership into a sense of loss. To more accurately delineate this transformation process, this work introduces the “endowment effect”. The endowment effect means that individuals are reluctant to lose a product they already have, such that individuals tend to psychologically price a product at a higher level when losing it than when purchasing it (Kahneman and Frederick 2002). This effect is greater when an individual feels a stronger sense of loss for forfeiting a product (Schurr and Ritov 2014). Consequently, the incremental value of the product will also be greater for the individual (Walasek et al. 2018).

Therefore, we operationalize the endowment effect as the increment in product value to consumers who develop an emotional attachment to a product after versus before encountering eWOM dispersion. Thus, the greater the increment, the stronger the endowment effect. Although endowment effect is usually discussed in situations when an individual loses a product he/she already possesses, research has shown that, rather than actual possession, the feeling of owning a product is enough for the endowment effect to take place (Carmon et al. 2003; Reb and Connolly 2007). That is, perception of “pre-factual ownership” can trigger the endowment effect, even if online shoppers do not own the product in reality (Carmon et al. 2003; Walasek et al. 2018). Accordingly, we propose hypothesis 1:

H1: when consumers already having an emotional attachment to a product and subsequently encountering dispersive eWOM, the higher the level of eWOM dispersion, the stronger the endowment effect.

2.3 Endowment effect and attribution for eWOM

Prior researches which were about how consensus played a role in consumer attribution, showed that consumers are subject to weighting distortions stemming from consensus information (i.e., the extent to which an eWOM distribution is dispersive) (He and Bond 2015). That is, when they are clarifying the behavior of an actor, if the majority of consumers behave similarly to the actor (i.e., prior consumer evaluations exhibit a high degree of consensus), product-related attribution will be more readily available; on contrast, as consensus decreases, high dispersion will more easily be ascribed to reviewer causality (He and Bond 2015).

However, when consumers are differently endowed, the directions of product and reviewer attribution may

indeed be malleable. Indirect insights suggest that increased attention to what is taking place in a potential exchange, imagination of ownership, and consumption of a product can enhance the emotional attachment of a product (Epstude et al. 2016). When consumers have already generated a strong attachment to the product, the uncertainty carried by highly dispersive eWOM will transform the feeling of pre-factual ownership of the product into a sense of loss in the forfeiture situation (Epstude et al. 2016); specifically, to forfeit the product is considered a loss (Carmon et al. 2003). In accordance with the notion of being loss-averse, the strong sense of loss in a forfeiture situation will engender overvaluation of the product, which will manifest itself in two ways. First, the perceived loss will guide the consumer to focus on the positive features of the product and to evaluate it more favorably (Chatterjee et al. 2013). Second, in such a situation, a consumer becomes more tolerant of the uncertainty carried by eWOM dispersion and so tends to ignore the disadvantages of the product (Epstude et al. 2016). To summarize, if the endowment effect derives from the letdown experienced by consumers, who encounter dispersive product eWOM after developing an emotional attachment to the product, and then influences the consumers' attributional inference about eWOM dispersion, we can propose such a causal chain: When consumers develop an emotional attachment to a product, different levels of eWOM dispersion will result in different states of the endowment effect and hence different attributional choices for eWOM dispersion. We propose therefore that eWOM dispersion exerts an influence on relevant attributional inferences via the endowment effect. Our hypothesis 2 is as follows:

H2: when consumers already having an emotional attachment to a product and subsequently encountering

dispersive eWOM, the endowment effect mediates the influence of eWOM dispersion on attributional inference about eWOM dispersion.

H2a: when consumers already having an emotional attachment to a product and subsequently encountering high-dispersion eWOM, the stronger endowment effect promotes more reviewer-related attributional inference of eWOM dispersion.

H2b: when consumers already having an emotional attachment to a product and subsequently encountering low-dispersion eWOM, the weaker endowment effect promotes more product-related attributional inference of eWOM dispersion.

2.4 The moderation of the display formats of eWOM dispersion

2.4.1 Different cognition processes of eWOM dispersion

The information process of eWOM dispersion is actually a type of consumers' psychological cognition activity (He and Bond 2015). And individual's information process can be partitioned into two main families, including the traditionally called Type 1 and the Type 2 that is now widely embraced under the general label of dual-process theory (Kahneman and Frederick, 2002). According to the classic dual-process view, Type 1 processing is a relatively effortless system and judgmental heuristics based on natural associative assessments, such as similarity matching, memory fluency and immediate experience. This fast, autonomous, unconscious operation is activated in order to assess judgement information rapidly and crudely as they arise (Simmons and Nelson, 2006). On contrast,

Type 2 processing is a relatively slow, resource-dependent, and analytical system that, occasionally, takes into account objective reasons. It operates consciously and is controlled by putting a cognitive load on working memory (Simmons and Nelson 2006) and overrides or undoes intuitive and associative responses through an elaborate and analytical system of reasoning. Also, these two processing types are often referred to as ‘intuitive’ or ‘heuristic’ and ‘rational’ or ‘analytical’, respectively (Stanovich and Toplak 2012). As cognitive psychology states, the reason that individuals tend to use Type 1 (intuitive or heuristic) lies in that when making assessments they usually try to categorize things they encounter in order to decrease complexity to a level that they can manage (Simmons and Nelson, 2006). In such occasions, intuition enables prospective consumers to process high-dispersion eWOM (high uncertainty) quickly based on heuristic system. However, more elaborate information process of high-dispersion eWOM can guide consumer to utilize more cognitive resources in their product-learning process.

This elaboration on products’ eWOM information can elicit an emotional attachment to the product (Dhar and Wertenbroch 2000). Elaboration on eWOM information serves as another important engine for emotional attachment to product (Dhar and Wertenbroch 2000), because it prompts consumers to connect to potential use experience and dig into the product, which in turn strengthens product familiarity and contributes to the development of emotional attachment (Carmon et al. 2003). Moreover, in a forfeit situation posed by uncertainty information (in our case, eWOM dispersion), as the time consumers spend in exploring a product extends, they tend to elaborate more on the possible benefits of the product (Stanovich and Toplak 2012). Therefore, eWOM information elaboration

can be a promoter for consumers to develop an emotional attachment and a feeling of ownership of product, such that consumers' emotional attachment grows as the level of eWOM information elaboration increases.

2.4.2 Different display formats of eWOM dispersion

If the analytical cognition system contributes to consumers' information elaboration of eWOM dispersion, and subsequently promotes consumers' emotional attachment of product, an important question this study will investigate is: how to promote consumers' analytic process of eWOM dispersion and ultimately results in the growth of consumers' product emotional attachment? The findings related to metacognition have indicated that the presence type of information is influential on individuals' deliberation and decisions in information process tasks. Metacognition is a broad term involving both knowledge and regulation of cognitive activity with an assumption that control affects monitoring (control-based monitoring; Stanovich and Toplak 2012; Pieger et al. 2017). According to Flavell (1981), metacognition includes three basic elements, which are metacognitive experiences, metacognitive knowledge, and metacognitive skills. The three elements operate in such a way that when a decision is weighty and risky, the tendency to think carefully and highly consciously provides individuals with a metacognition experience, which then activates related metacognitive knowledge in long-term memory and links it to the current cognitive activities. As a result, individuals will utilize metacognitive skills to complete cognitive activities. A cognitive strategy in nature, the analytic system belongs to the category of metacognitive skills. According to metacognitive theory, to utilize the cognitive strategy of analytic system, relevant metacognitive experiences must first be activated

(Flavell 1981). Because consumers' decision making and judgements are usually based on (metacognitive) experiences while they are browsing eWOM distribution, the experiences regarding whether the information is fluent (easy) or disfluency (difficult) to process will serve as a metacognitive cue that affects subsequent processing (Stanovich and Toplak 2012; Pieger et al. 2017). Moreover, the more disfluently information is processed on a perceptual level, the less confident individuals are that the information can be interpreted (e.g. Pieger et al. 2017). This link is referred to as improving monitoring accuracy by reducing overconfidence—a metacognitive bias that relies on intuition to process information, and can be detrimental to self-regulated judgement (e.g. Dunlosky and Rawson 2012). Therefore, the use of two different ways of cognitive processes can depend on the perceived fluency or disfluency in a given cognitive task (Stone et al. 2003).

EWOM dispersion in previous studies has usually been depicted with a “horizontal bar chart” . However, in addition to graphical summaries of reviewer ratings, some online retailer websites, such as Tmall.com and Taobao.com display “reviewers' impressions of product” (some phrases to summarize eWOM content, which are extracted based on the frequency of their mention in eWOM content). Therefore, this study explores eWOM dispersion in represented by displaying “horizontal bar chart” versus “reviewers' impressions of product” respectively. As mentioned above, consumers' cognitive process of eWOM is depended on the perceived fluency or disfluency in a given cognitive task that can be operationalized as a simple (i.e. ease of processing) or complex (i.e., difficulty of processing) form of displaying mixed opinions. And compared with the display format of eWOM

dispersion that is processed simply or fluently, the one that is processed with complexity or disfluency will lead more elaborate (analytic) process of eWOM dispersion.

Therefore, this study proposes that the different display formats of eWOM dispersion (i.e. “horizontal bar chart” vs. “reviewers’ impressions of product”) represent different disfluency levels, with which they will moderate the endowment effect by shaping the process of product information elaboration. Specifically, compared with the display format of eWOM dispersion that is processed simply or fluently, the one that is processed with complexity or disfluency will enhance the endowment effect on consumers. Accordingly, hypotheses 3 and 4 are proposed, and the conceptual framework is summarized in Figure 2:

H3: when consumers already having an emotional attachment to a product and subsequently encountering dispersive eWOM, the positive influence of eWOM dispersion on endowment effect is stronger for eWOM dispersion in the complexity or disfluency display format than for eWOM dispersion in the simply or fluency display format.

H4: The mediating influence of endowment effect on attributional inferences is moderated by the display formats of eWOM dispersion.

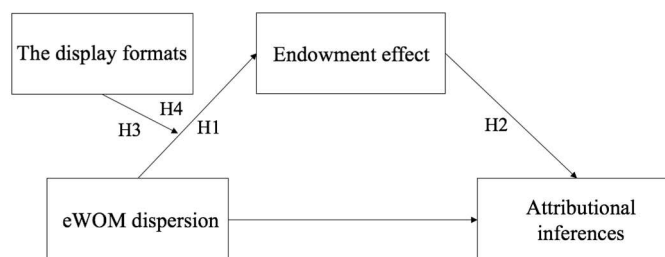


Figure 2 Theoretical Framework

3. Methodology

3.1 Study 1

Study 1 focused on consumers who felt an attachment to a product which was designed to examine the influence of eWOM dispersion on the endowment effect (H1), and the mediating effect of the endowment effect on the influence of eWOM dispersion on attributional inference (H2). Study 1 utilized a between-subject design, and the manipulated or measured variables included: eWOM dispersion (between-subject factor: high vs. low), endowment effect, and attributional references about eWOM dispersion.

3.1.1 Method

Pretest. Sixty-two adults (45 females; mean age = 30.61, SD = 1.73) participated in this pretest in exchange for monetary compensation. They were offered five product options, all of which were books of a suspense type; they were presented with just the cover of the book and a brief introduction to it. The stimuli imitated the book cover and the introduction displayed on Amazon.cn, and these two elements were the only information provided. This was done to eliminate the possible influence of price, brand and other factors on consumers' emotional attachment of product. There were two reasons that suspense books were chosen. One, these enable consumers to make a quick decision about how much they favor the product and whether they intend to go on and read it, which makes the discussion of products' emotional attachment possible. Two, suspense books could eliminate the possible influence of gender disparity on products' emotional attachment (in a separate pretest, male and female have shown the almost

same fondness for suspense books, $N=16$, $M_{male} = 4.9$, $M_{female} = 4.7$). All participants had never bought or read the five books presented to them. After viewing the introduction to each book, participants were asked to rate their emotional attachment to each book on three seven-point attitude items (Carmon et al. 2003), ranging from ‘not at all attractive’ to ‘very attractive’, ‘not at all enjoyable’ to ‘very enjoyable’, and ‘not at all favorable’ to ‘very favorable’. Taking the high correlation among these items into consideration ($\alpha = 84\%$), the mean value among three items created an overall evaluation score of emotional attachment to each book. Based on the results, the book entitled *Destructive Justice* was chosen for use in experiment 1 ($M_3 = 5.80$; $M_1 = 3.41$, $M_2 = 2.90$, $M_4 = 2.77$, $M_5 = 1.20$). Given that consumers are inclined to avert low-rated choices (He and Bond 2015), the average aspiration level of 5.6 (SD = 1.44) was also calculated based on participants’ reports of the minimum average rating (1-10 star) required for products in their consideration set (He and Bond 2015). The design of stimuli in the main studies was based on the average ratings above this level.

Main Study. One hundred and ninety-eight participants (74 females; mean age = 22.61, SD = 1.20) were recruited and were paid for their participation. Fourteen participants who had read or purchased the book before were excluded, leaving a usable sample of one hundred and eighty-four participants. When the study began, participants were guided into a purchase scenario: an online retail platform is selling a suspense novel named *Destructive Justice* and is launching an event to introduce this book. Based on results of a pretest, participants were then presented with the cover and a brief introduction to the book, and were asked to predict subsequent plots and to write down their

potential reading experience (Abendroth and Diehl 2006). Then participants were asked to rate their emotional attachment to the book on three seven-point attitude items (Carmon et al. 2003). Based on the results of mean value, participants were divided to two groups: strong emotional attachment ($N = 150, M = 6.2$) vs. weak emotional attachment ($N = 34, M = 1.0$). On the next screen, they needed to make a choice from two options (option 1 ('continue to learn more about the product' eWOM information') vs. option 2 ('consider/browse other products')). The results showed that all participants in strong emotional attachment have chosen option 1, however, almost participants in weak emotional attachment have chosen option 2 (97%). These results were consistent with the conclusions of the open-ended survey that the precondition of consumers' reference to eWOM was that they became fond of the product (emotional attachment). Because the endowment effect in this research was operationalized as the increment in product value to consumers who develop an emotional attachment to a product after versus before encountering eWOM dispersion. So participants in weak emotional attachment were excluded, leaving usable samples of one hundred and fifty participants.

After choosing the option1, participants in strong emotional attachment were presented with the distributions of eWOM dispersion, and they were randomly assigned to two conditions: high-dispersion eWOM ($N=75$) versus low-dispersion eWOM ($N=75$): in all cases, the distribution including ratings from 40 reviewers were exhibited on a scale ranging from 1 to 10 stars, with more stars denoting greater satisfaction. On the right side of each star rating, there was a horizontal bar showing the number of reviewers which assigned that rating, while at the top of each

distribution the overall average rating was presented (He and Bond 2015). Participants in a high-dispersion condition viewed the distributions with a combination of high dispersion ($var = 8.5 > 8.0$) and average rating of 6 stars; participants in a low-dispersion condition viewed the distributions with a combination of low dispersion ($var = 0.7 < 1.0$) and average rating of 6 stars (He and Bond 2015). After that, each participant responded to items pertaining to the endowment effect and attributional inferences. The whole process was self-paced, as the time needed for viewing and evaluating varies among individuals. Finally, all participants were asked for their opinions on what they thought the aim of this study was. Results showed that participants had no idea what the intention was.

Measurement of variables

(1) eWOM dispersion. As a manipulation check of eWOM dispersion, participants were asked to rate the dispersion of the eWOM on a 7-point semantic differential scale (“*To what extent do you think this eWOM distribution is consistent or dispersive?*”). The results confirmed the success of manipulation ($M_{high\ dispersion} = 5.57$, $M_{low\ dispersion} = 2.18$, $p = .0004 < 0.001$).

(2) Endowment effect. Following prior research (Carmon et al. 2003; Nayakankuppam and Mishra 2005), we directly measured the increment in product value assessed by participants to represent the magnitude of the endowment effect, in order to prevent the influence of product price. The scale asked participants to indicate: “How do you assess the value of the book after vs. before viewing the eWOM (1=I feel it is less valuable after viewing the eWOM than before; 7=I feel it is more valuable after viewing the eWOM than before.)”; “How is the book’s

attractiveness for you after vs. before viewing the eWOM (1=I feel it is less attractive after viewing the eWOM than before; 7=I feel it is more attractive after viewing the eWOM than before); and “How much you cherish the book after vs. before viewing the eWOM (1= cherish it less after viewing the eWOM than before; 7=I cherish it more after viewing the eWOM than before)”. The scale exhibited relatively high reliability ($\alpha = 0.773$), and the average score across the three questions served as an indicator of the endowment effect.

(3) Attributional inference of eWOM dispersion. Participants reported their attributional inferences (“Do you think the product or the reviewers were more responsible for the ratings above?”) on a seven-point bipolar scale (1 = ‘the product,’ 7 = ‘the reviewers’) (Chen and Lurie 2013; He and Bond 2015). Higher (lower) scores denoted greater reviewer (product) attribution.

3.1.2 Results and discussion

We tested the influence of eWOM dispersion on attributional inference, even though it had been confirmed by the established attribution-based model (He and Bond 2015). Results of ANOVA revealed a significant main effect of eWOM dispersion on attributional inference ($F(1, 149) = 60.04, p = .0004 < 0.001$). Consistent with the finding of He and Bond (2015), consumers’ tendency to attribute eWOM dispersion to reviewer-related causality grows as eWOM dispersion exacerbates ($M_{high\ dispersion} = 4.50, M_{low\ dispersion} = 2.62$).

We then tested the influence of eWOM dispersion on the endowment effect. Results of ANOVA revealed a significant main effect of eWOM dispersion on endowment effect ($F(1, 149) = 62.90, p = .0004 < 0.001$). This meant

that the endowment effect was significantly stronger in a high-dispersion condition than in a low-dispersion condition

($M_{high\ dispersion} = 5.80$, $M_{low\ dispersion} = 4.02$). H1 was therefore supported (see Figure 3).

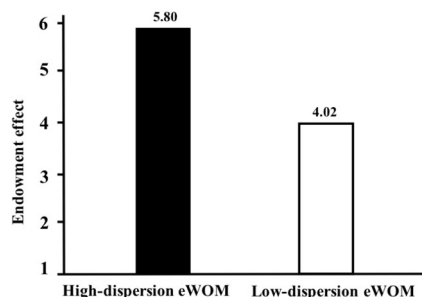


Figure 3 Endowment Effect by High-dispersion eWOM and Low-dispersion eWOM

Finally, we conducted a mediation analysis focusing on the effect of eWOM dispersion (independent variable: 0 = low-dispersion eWOM, 1 = High-dispersion eWOM) on attributional inferences (dependent variable) via endowment effect (mediator). Given that only independent variable in the analysis was binary, we were able to use Hayes' (2013) bootstrapping PROCESS model with repeated extraction of 5,000 samples and model 4 (for the test of simple mediating effect). Results indicated that the indirect pathway through endowment effect was positive and significant ($B = 0.97$, $Boot\ SE = 0.36$, $Boot\ LLCT = 0.27$, $Boot\ ULCT = 1.71$), and the 95% confidence interval (CI) excluded zero. Follow-up analysis revealed that, after controlling for endowment effect, the direct effect of eWOM dispersion on attributional inferences was not significant ($p = 0.61$, $B = 0.20$, $Boot\ SE = 0.41$, $Boot\ LLCT = -0.53$, $Boot\ ULCT = 0.98$), and the 95% confidence interval (CI) included zero. All results showed that the endowment effect fully, rather than partially, mediated the relationship between eWOM dispersion and attributional inferences, H2 was therefore supported. In other words, when participants already having an emotional attachment to a product

and subsequently encountering high-dispersion eWOM, the stronger endowment effect promoted participants to make more reviewer-related attributional inference of eWOM dispersion, and the weaker endowment effect promoted participants to make more product related attributional inference, H2a and H2b were therefore supported.

Study 1 attempted to explore the mediation of the endowment effect for a product by varying its magnitude and controlling other possible factors such as price, product domain, and brand. Nevertheless, the product category may account for the different degrees of emotional attachment to product (Dhar and Wertenbroch 2000). Studies on mental imagery provide indirect insights for our investigation. Mental imagery refers to the process of presenting sensory information in working memory, that is, the vivid, specific, and evocative presentation of product use experience and feelings in the mind (Macinnis and Price 1987). In other words, mental imagery enhances emotional attachment to the product, that is, it increases the emotional dependence of a consumer to a product, increasing their endowment.

3.2 Study 2

Based on Study 1, we aimed to introduce a product high in mental imagery in Study 2 to further testify the robustness of findings from Study 1. Study 2 centered around a situation when consumers developed an emotional attachment to a product that is high in mental imagery, and probed into the influence of eWOM dispersion on the endowment effect (H1), and the mediating effect of the endowment effect on the relationship between eWOM dispersion and attributional inferences (H2) in this situation. Similar to Study 1, Study 2 utilized a between-subject design, and the manipulated or measured variables included: eWOM dispersion (between-subject factor: high vs.

low), endowment effect , and attributional references about eWOM dispersion.

3.2.1 Method

Pretest. An open-ended survey was conducted on an online survey platform (wjsx.cn) among 145 participants (55 females; mean age = 38.26, SD = 2.51). The question was “When you are shopping online, what product is most (and least) easy for you to predict future use experience and feelings based on product information provided by the retailer?” As the results suggested, apparel ($M=8.1$) and movies ($M=5.5$) were the top two products that fell within “the easiest” category, whereas digital products ($M=1.2$) and cosmetics ($M=1.6$) were the top two products in “the least easy” category. Therefore, we chose apparel as it was easiest for participants to imagine the experience and feelings of using such a product.

Main study. A total of one hundred and fifteen participants (40 females; mean age = 31.58, SD = 2.40) participated in this study with monetary compensation. All participants were instructed to make decisions on the basis of the information presented on screen: “*You are visiting a popular online retailing website. After reading product information, you settled on a jacket. Looking at the images, you start thinking about what might go with this jacket and imagining yourself looking great in it.*” After reading the brief instruction, participants were required to describe two occasions when they wanted to wear the jacket and a specific dinner where they would need something to go with this jacket for this one occasion, describe people they would meet during the activities, and write down their thoughts and feelings (Abendroth and Diehl 2006). These steps were to lead participants into a scenario where they

became fond of the product by browsing and exploring product information. Then participants were asked to rate their emotional attachment to the jacket on three seven-point attitude items (Carmon et al. 2003), ranging from 'not at all attractive' to 'very attractive', 'not at all enjoyable' to 'very enjoyable', and 'not at all favorable' to 'very favorable'. Based on the results of mean value, participants were divided to two groups: strong emotional attachment ($N = 104, M = 5.92$) vs. weak emotional attachment ($N = 11, M = 0.82$). On the next screen, they needed to make a choice from two options (option 1: 'continue to learn more about the product' eWOM information' vs. option 2: 'consider/browse other jackets'). The results showed that almost all participants in strong emotional attachment have chosen option 1 (98.1%), and all participants in weak emotional attachment have chosen option 2. Similar to Study 1, participants in weak emotional attachment and in choosing option 2 were excluded, leaving a usable sample of one hundred and two participants.

As with Study 1, participants in Study 2 were randomly assigned to two conditions: high-dispersion eWOM ($N=51$) vs. low-dispersion eWOM ($N=51$). On the next screen, participants in a high-dispersion eWOM condition viewed the distributions with a combination of high dispersion ($var = 8.8$) and an average rating of 6 stars; for the low-dispersive group, participants in a low-dispersion eWOM condition ($var = 0.8$) viewed the distributions with a combination of low dispersion and an average rating of 6 stars. After that, each participant responded to items pertaining to the endowment effect and attributional inferences. The time needed for viewing and evaluating were self-paced by participants. All participants had no idea what the intention of this study was.

Measurement of variables

(1) eWOM dispersion. Similar to Study 1, the manipulation check suggested that the high and low eWOM dispersion was manipulated successfully ($M_{high\ dispersion} = 6.10$, $M_{low\ dispersion} = 1.46$, $p = 0.005 < 0.001$).

(2) Endowment effect. Similar to Study 1, participants were asked to rate their endowment effect to the jacket on three seven-point attitude items (Carmon et al. 2003; Nayakankuppam and Mishra 2005). The scale exhibited relatively high reliability ($\alpha = 0.82$), and the average score across the three questions served as the indicator of the endowment effect.

(3) Attributional inferences of eWOM dispersion. On contrast to Study 1, participants made their causal attributions by answering two separate items (“Do you think the characteristics of the reviewer [tastes, individual styles, etc.] were responsible for causing the distribution above?”) on a 9-point scale (1 = ‘not at all’ to 9 = ‘extremely’); (“Do you think the product characteristics [look, quality, etc.] were responsible for causing the distribution above?”) on a 9-point scale (1 = ‘not at all’ to 9 = ‘extremely’) (He and Bond 2015). To create a relative attributional inferences score, we computed the difference between the two items, with a higher score indicating greater reviewer attributional inference.

3.2.2 Results and discussion

As with Study 1, we tested the relationship between eWOM dispersion and attributional inferences. Results of ANOVA revealed a significant main effect of eWOM dispersion on attributional inferences ($F(1, 101) = 82.02$, p

=.0005 < 0.001), suggesting that participants tended to attribute high eWOM dispersion to reviewer causality, instead of product causality ($M_{high\ dispersion} = 7.20$, $M_{low\ dispersion} = 4.78$).

The influence of eWOM dispersion on the endowment effect was then examined. Results of ANOVA revealed a significant main effect of eWOM dispersion on the endowment effect ($F(1, 101) = 70.21, p = .0004 < 0.001$). Given that the endowment effect was more significant for high eWOM dispersion than for low eWOM dispersion ($M_{high\ dispersion} = 6.20$, $M_{low\ dispersion} = 5.35$), H1 was supported (see Figure 4).

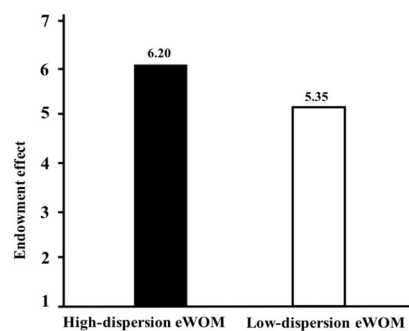


Figure 4 Endowment Effect by High-dispersion eWOM and Low-dispersion eWOM

We also conducted the mediation analysis focusing on the effect of eWOM dispersion (independent variable: 0 = low-dispersion eWOM, 1 = High-dispersion eWOM) on attributional inferences (dependent variable) via endowment effect (mediator). By using Hayes' (2013) bootstrapping PROCESS model with repeated extraction of 5,000 samples and model 4 (for the test of simple mediating effect), we found that the indirect pathway through endowment effect was positive and significant ($B = 1.62$, $Boot\ SE = 0.47$, $Boot\ LLCT = 0.88$, $Boot\ ULCT = 3.01$), and the 95% confidence interval (CI) excluded zero. Furthermore, after controlling for endowment effect, the direct effect of eWOM dispersion on attributional inferences was not significant ($p = 0.81$, $B = 0.39$, $Boot\ SE = 0.62$, $Boot$

LLCT = -0.83, Boot ULCT = 1.28), and the 95% confidence interval (CI) included zero. All results showed that the endowment effect fully, rather than partially, mediated the relationship between eWOM dispersion and attributional inferences, H2 was therefore supported. In summary, the results suggested that eWOM dispersion exerted an influence on relevant attributional inferences via the endowment effect, and similar to Study 1, when participants already having an emotional attachment to a product that was high in mental imagery and subsequently encountering high-dispersion eWOM, the stronger endowment effect promotes the more reviewer-related attributional inference rather than product-related inference, H2a and H2b were therefore supported. Furthermore, by introducing apparel, a product high in mental imagery, Study 2 proved the robustness of the findings from Study 1. Meanwhile, a comparison between results in Studies 1 and 2 demonstrated that, compared with general products (e.g., the book in Study 1), products high in mental imagery (e.g., apparel in Study 2), which were more likely to elicit an emotional attachment to a product, consequently triggered a more significant endowment effect in the presence of high-dispersion eWOM ($M_{Study\ 2} = 6.20 > M_{Study\ 1} = 5.80$), and eventually would drive the propensity of consumers to attribute eWOM dispersion to reviewer causality ($M_{Study\ 2} = 7.20 > M_{Study\ 1} = 4.50$).

As with Study 1, Study 2 followed the practice of prior research (e.g., Sun 2012; He and Bond 2015) to display eWOM dispersion with the horizontal bar chart, which integrated both positive and negative opinions with a single number. This could overlook any effect actual eWOM content might have. It was therefore imperative to further verify the moderating effect of the display formats of eWOM dispersion (H3 and H4). Meanwhile, Study 2 found

that consumers' tendency to use mental imagery may vary across product categories. That is, different product categories may stimulate different levels of emotional attachment to a product. Research reported that a hedonic product was more likely to elicit emotional attachment and consequently trigger a stronger endowment effect, compared with a utilitarian product (Cramer and Antonides 2011). Therefore, Study 3 was conducted to address these two issues.

3.3 Study 3

In Study 3, we propose that when participants already having an emotional attachment to a product and subsequently encountering eWOM dispersion, the positive influence of eWOM dispersion on endowment effect is stronger for eWOM dispersion in the complex or disfluency display format than for eWOM dispersion in the simply or fluency display format (H3). And the mediating influence of endowment effect on attributional inferences is moderated by the display formats of eWOM dispersion (H4). Therefore, based on Studies 1 and 2, on the one hand, the most important goal of Study 3 was to compare two display formats of eWOM dispersion (“horizontal bar chart” vs. “reviewers’ impression of product”) at the same level of eWOM dispersion. On the other hand, to provide retailers with better insights into products, Study 3 also divided stimuli in the Study 2 pretest into two categories: hedonic products (Movie: $M_{mental\ imagery}=5.5$) vs. utilitarian products (Smartphone: $M_{mental\ imagery}=1.2$). Furthermore, it should be noted that the target distribution only depicted high dispersion in Study 3, given that the focus of Study 3 was on the display formats of eWOM dispersion. We did so because behavioral results do not reflect the existence

of the elaboration process unless different cognition processes lead to different responses (Stanovich and Toplak 2012). Thus, consumers in face of low eWOM dispersion may make very similar decisions, and thus cannot reflect discrepancy in information processing due to different display formats. Study 3 utilized a between-subject design, and the manipulated or measured variables included: eWOM dispersion (high level), display formats of eWOM dispersion (between-subject factor), endowment effect, and attributional references about eWOM dispersion.

For the discussion of the display formats of eWOM dispersion, we have summarized two different display formats based on the real online retail platforms. We found that, in addition to display eWOM dispersion in the “horizontal bar chart”, some online retailers, such as Tmall.com, JD.com and Taobao.com, displayed eWOM dispersion in the format of “reviewers’ impressions of product”. For the characteristics of “horizontal bar chart”: distribution ratings from all reviewers were exhibited on a scale ranging from 1 to 10 (or 5) stars, with more stars denoting greater satisfaction, and on the right side of each star rating, there was a horizontal bar showing the number of reviewers which assigned that rating, while at the top of each distribution the overall average rating was displayed (He and Bond 2015). For the characteristics of “reviewers’ impression of product”: some phrases of eWOM content were extracted based on the frequency of their appearance in the all reviewers’ eWOM content of the product, and on the right side of each phrase, there was the number of appearances which assigned that phrase, while on the left side of “reviewers’ impression of product” distribution the overall average rating was displayed.

In order to compare the complexity or fluency of two display formats in Study 3, we firstly needed to

determine the degree of high-dispersion eWOM. For the display format of “horizontal bar chart”, high-dispersion eWOM was depicted with high variance ($variance = 8.9$) (He and Bond 2015), including ratings from 40 reviewers were exhibited on a scale ranging from 1 to 10 stars, and the average rating was 6 star. And for the display formats of “reviewers’ impression of product”, detailed analysis was conducted in the following pretest.

3.3.1 Method

Pretest. First, the sets of reviewers’ impressions of products developed resembled the reviews on these three popular retailer websites (Tmall.com, JD.com and Taobao.com) and were then manipulated to depict a high level of dispersion. Second, smartphone was chosen to represent utilitarian products (Jiménez and Mendoza 2013), and a movie was chosen to represent hedonic products (Duan et al. 2008), and subsequently we developed the “reviewers’ impression of product” based on different product types: forty adults (12 females; mean age = 24.91, SD = 2.05) familiar with online reviews helped to determine the frequencies of each phrase and high-dispersion eWOM in the display format of “reviewers’ impressions of the product” (Purnawirawan et al. 2012) (Table 5 provides details)¹.

Table 5 Product Categories and Reviewers’ Impressions

Product categories	Reviewers’ impressions of the product
Smartphone	Good camera quality (N=10); Smooth system performance (N=8); Decent call quality (N=3); High resolution (N=5); Metal-made (N=3); Bad sound quality (N=5); Poorly-designed (N=2); Slow (N=4).
Movie	Good plot (N=7); Heartwarming story (N=11); Creative storytelling (N=2); Good movie (N=5); Good cast (N=3); Bad script (N=4); Incoherent storyline (N=4); Terrible soundtrack (N=4).

¹ We collected 40 phrases respectively for the smartphone and movie through a content analysis of review websites. Respondents were asked to rate the positivity and negativity of each of these phrases on a 7-point Likert scale. The 5 most positive and 3 most negative phrases from among the smartphone/movie phrases were incorporated into the reviewers’ impressions of the product. And the average rating was also 6 stars. This approach follows Purnawirawan et al. (2012).

As a note, within the display format of “reviewers’ impression of product”, a distinction may be made between the complexity or fluency caused by the intrinsic elements (i.e. the kind of phrases of product were chosen from prior reviewers’ eWOM content) and the complexity or fluency caused by the extraneous elements (e.g. eWOM distribution was depicted eWOM content rather than single number, the font in size and color) (Seufert et al., 2017). However, whatever they are intrinsic elements or extraneous elements, both of them are the parts of the display format of “reviewers’ impression of product”. Therefore, the focus in this work was the complexity or fluency caused by the display format of “reviewers’ impression of product”, but not the complexity or disfluency caused by this formats’ intrinsic elements or extraneous elements. Table 6 illustrates stimulus images representing high eWOM dispersion, different product categories, and different display formats.

Table 6 Stimulus Pictures

Product categories	eWOM dispersion (N = 40)	average rating (6 star)
	The display format of “horizontal bar chart”	The display format of “reviewers’ impression of product”
Utilitarian product (smartphone)	<p>average review</p> <p>6 star, up to 10 star N=40</p>	<p>average review</p> <p>6 star, up to 10 star N=40</p> <p>Reviewers’ impression of product</p> <ul style="list-style-type: none"> Good camera quality (N=10) Smooth system performance (N=8) Decent call quality (N=3) High resolution (N=5) Metal-made (N=3) Bad sound quality (N=5) Poorly-designed (N=2) Slow (N=4)
	Hedonic product (movie)	<p>average review</p> <p>6 star, up to 10 star N=40</p>

Note: Reviewers’ Impressions for utilitarian product (Smartphone) and hedonic product (Movie) were those in Table 5.

Main study. One hundred and thirty-two participants (48 females; mean age = 26.51, SD = 2.42) were recruited

through posters and were paid for their participation. They were randomly assigned to four groups: “horizontal bar chart” × “utilitarian product” group (N=33), “horizontal bar chart” × “hedonic product” group (N=33), “reviewers’ impression of product” × “utilitarian product” group (N=33), “reviewers’ impression of product” × “hedonic product” group (N=33). In the beginning, participants were presented with a simulative online retail platform, on which they viewed product descriptions about several smartphones (“utilitarian product” groups) or movies (“hedonic product” groups) as per their respective groups. To avoid interference by brand, price, and other factors, the descriptions only contained product images and necessary product information. After that, participants needed to pick one smartphone or movie they most liked and orally explained why they liked it. On the next screen, similar to Study 1 and 2, regardless of the product choice of participants, they needed to make a choice from two options (option 1(‘continue to learn more about the product’ eWOM information’) vs. option 2 (‘consider/browse other products’)). The results showed that all participants have chosen option 1, so all participants have become fond of the product (emotional attachment) which chosen by themselves. Next, the screen directed participants to respective stimuli (See Table 6), then they responded to items pertaining to eWOM dispersion, display formats of eWOM dispersion, endowment effect, and attributional inferences. The whole process was self-paced by participants, and they had no idea what the experiments’ intention was.

Measurement of variables

(1) High-dispersion eWOM. In the two “horizontal bar chart” conditions, high-dispersion eWOM was depicted

with high variance ($var. = 8.9$) (He and Bond 2015). As a check of the dispersion manipulation, they were asked to rate the dispersion of the eWOM on a 7-point semantic differential (“*To what extent do you think this eWOM distribution is consistent or dispersive?*”). The manipulation check suggested high-dispersion eWOM was manipulated successfully ($M = 6.02, SD = 1.11$). In the two “reviewers’ impression of product” conditions, participants were asked to rate the dispersion of a set of reviewers’ impressions of the product on a 7-point semantic differential (“*To what extent do you think this set of reviewers’ impressions is consistent or dispersive?*”). The results confirmed that the reviewers’ impressions of the smartphone were perceived as highly dispersive ($M = 5.88, SD = 1.43$), and so were the reviewers’ impressions of the movie ($M = 6.16, SD = 1.25$).

(2) The display formats of eWOM dispersion. All participants answered questions about information processing complexity or fluency regarding their respective display formats: “Was the eWOM complex to understand (1 = very simple, 7 = very complex) ?”, and “What was your speed viewing the eWOM (1=very quick, 7=very slow)?” (Pocheptsova et al. 2010). The scale was found to possess high reliability ($\alpha = 0.79$). Scores averaged across the two questions were significantly lower in horizontal bar chart conditions ($M=2.11, SD=1.58$) than in “reviewers’ impression of product” conditions ($M=5.24, SD=1.12$). This indicated that the display formats of high-dispersion eWOM led to discrepancy in information processing complexity and fluency. In Study 3, highly dispersive eWOM displayed in a “horizontal bar chart” was simpler and more fluent for participants to process, whereas highly dispersive eWOM displayed in “reviewers’ impression of product” was more complex and disfluent for participants

to process. It should be noted that the statement of “simple vs. complex” and “fluent vs. influent” was a division of comparative results and did not have absolute meanings. Furthermore, according to the mean value plus or minus a standard deviation, high-dispersion eWOM in two display formats was distinguished.

(3) Endowment effect. Similar to Study 1 and 2, participants were asked to rate their endowment effect to the jacket on three seven-point attitude items (Carmon et al. 2003; Nayakankuppam and Mishra 2005). The scale exhibited relatively high reliability ($\alpha = 0.81$), and the average score across the three questions served as an indicator of the endowment effect.

(4) Attributional inferences. Participants reported their attributional inferences (“Do you think the product or the reviewers were more responsible for the ratings above?”) on a seven-point bipolar scale (1 = ‘the product,’ 7 = ‘the reviewers’) (Chen and Lurie 2013; He and Bond 2015). Higher (lower) scores denoted greater reviewer (product) attribution.

3.3.2 Results and discussion

Analysis results, shown in Figure 5, demonstrated that participants in the “reviewers’ impression of product” conditions ($M=5.11$) scored significantly higher than those in the “horizontal bar chart” conditions ($M=3.16$) in terms of endowment effect ($F(1, 131) = 81.51, p = .0004 < 0.01$).

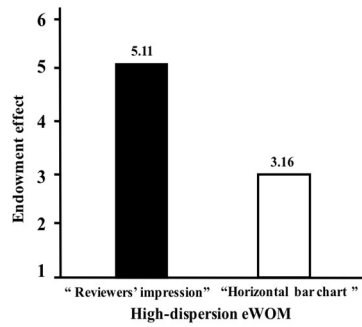


Figure 5 Endowment Effect by High-dispersion eWOM and Its Display Formats

And when product category was taken into consideration, a significant high-dispersion eWOM \times display format \times product category interaction appeared ($F(1, 131) = 49.22, p = .0003 < 0.01$). As illustrated in Figure 6, when the target product is a hedonic product (e.g. movie), the endowment effect is significantly stronger among participants encountering high eWOM dispersion displayed in “reviewers’ impression of product” ($M=6.12$) than those encountering high eWOM dispersion displayed in a horizontal bar chart ($M=4.47, F(1, 65) = 70.15, p = .0003 < 0.01$). When the target product is a utilitarian product (e.g. smartphone), the endowment effect is also significantly stronger among participants encountering high-dispersion eWOM displayed in “reviewers’ impression of product” ($M=3.11$) than those encountering high-dispersion eWOM displayed in a horizontal bar chart ($M=2.58, F(1, 65) = 52.21, p = .0005 < 0.01$). In sum, this pattern of results persisted even after difference in product category was considered. H3 was therefore supported.

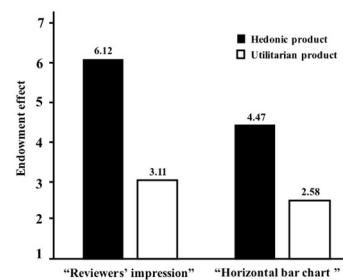


Figure 6 Endowment Effect by High-dispersion eWOM, Product Category, and the Display Formats of High-dispersion eWOM

Then we conducted a moderated mediation analysis, using Hayes' (2013) bootstrapping PROCESS model with repeated extraction of 5,000 samples and model 7 (for the test of first-stage moderated mediation). The first-stage moderated mediation included the display formats of high-dispersion eWOM as the moderator (1= "reviewers' impression of product", 0= "horizontal bar chart"), endowment effect as the mediator, and attributional inferences as the dependent variable. Result suggested that the indirect pathway through endowment effect was positive and significant ($B = 0.53$, Boot SE = 0.25, Boot LLCT = 0.23, Boot ULCT = 1.39, and the 95% confidence interval excluded zero). Follow-up analyses of conditional indirect effects revealed that the effect of high-dispersion eWOM through endowment effect was stronger for the display of high-dispersion eWOM in "reviewers' impression of product" format ($B = 0.39$, Boot SE = 0.20, Boot LLCT = 0.45, Boot ULCT = 0.89, and the 95% confidence interval excluded zero) than for the display in "horizontal bar chart" format ($B = 0.07$, Boot SE = 0.20, Boot LLCT = 0.02, Boot ULCT = 0.48, and the 95% confidence interval excluded zero). H3 and H4 were therefore supported.

By comparing two display formats ("reviewers' impression of product" vs. "horizontal bar chart") at the same level of eWOM dispersion and introducing the discussion of product categories (hedonic products vs. utilitarian products), study 3 provided a moderated mediation analysis of the framework. Results were consistent with our hypotheses: compared with the display format of high-dispersion eWOM that was processed simply or fluently (i.e. "horizontal bar chart"), the one that was processed with complexity or disfluency (i.e. "reviewers' impression of product") would enhance the endowment effect on participants. Moreover, the mediating influence of endowment

effect on attributional inferences was moderated by the display formats of high-dispersion eWOM.

4. General Discussion

Three studies provide converging evidence supporting our theoretical framework. Because reviewer-related attribution inference is critical in mitigating negative influences of eWOM dispersion on consumer decisions (He and Bond 2015), therefore, in this respect, adopting an attribution-based approach, Study 1 first demonstrates that, for consumers already having an emotional attachment to a product, the more dispersive the eWOM they subsequently encounter is, the stronger their endowment effects will be. This endowment effect manifests in the form of the increment in product value and degree of cherishing that consumers assign to a product, as well as the attractiveness the product has for consumers, and tends to impel consumers to attribute high-dispersion eWOM to reviewer causality. Study 2 advances Study 1 by further introducing a product high in mental imagery, i.e., apparel, to elucidate that products high in mental imagery can trigger stronger endowment effects among consumers than general products (e.g., book). In addition, Study 2 further confirms the mediating role of the endowment effect in the relationship between eWOM dispersion and attributional inferences, and proves the robustness of the Study 1 conclusion. Study 3 indicates that the display formats of eWOM dispersion affect the perceived complexity and fluency of product information processing, thereby moderating the level of emotional attachment to a product and hence the endowment effect. And the mediating influence of endowment effect on attributional inferences is also moderated by the display formats of eWOM dispersion. Even after product category is taken into consideration. The results hold for books

(Study 1), apparel (Study 2), smartphones (Study 3), and movies (Study 3) reviews.

4.1 Theoretical Implications

Firstly, this work shed new light on the current literature of eWOM dispersion by exploring the important role of situational factors leading to consumers' reference of eWOM dispersion. Specifically, this paper extracts the situational factor using an open-ended survey and proves that the precondition of consumers' reference to eWOM information is that they need to browse and explore product information and then become fond of the product (emotional attachment). Therefore, this finding can deepen our understanding of the degree of salience required to observe the influence of eWOM dispersion on consumers' decisions. Second, this study extends the discussion regarding the role of endowment effect in e-retailing environment. The endowment effect is introduced to delineate the process in which "the feeling of ownership" arising from emotional attachment transforms into "a sense of loss" due to high-dispersion eWOM (uncertainty and risks). More specifically, for consumers who have developed emotional attachment to a product, higher eWOM dispersion subsequently triggers a stronger endowment effect, and this embodies the improvement in product value and the degree of cherishing consumers assign to the product, as well as in the attractiveness the product has for consumers. In addition, our investigation suggests that consumers have stronger endowment effects for hedonic products than for utilitarian products. This finding shed light on how difference in product category have impact on discrepancy in consumers' endowment effect. Third, to the best of our knowledge, we firstly explore the mechanisms of consumers' attributional inferences of eWOM dispersion in the e-

retailing settings. By developing the mediation mechanisms between the eWOM dispersion and attributional inferences, this work shows that the pre-situational factor for consumers' attributional inferences to eWOM dispersion is that they already have an emotional attachment to the product but then encounter eWOM dispersion. Although a range of pre-situational factors might influence consumers' attribution tendency, our framework suggests that the endowment effect is an important consideration, and provides further understandings for consumer engagement in attributional inferences of eWOM dispersion. Finally, this research advances our understanding of the display format of eWOM dispersion. By comparing two main display formats of eWOM dispersion ("horizontal bar chart" vs. "reviewers' impression of product"), we find that the positive influence of eWOM dispersion on endowment effect is stronger for eWOM dispersion in the "reviewers' impression of product" format than for eWOM dispersion in the "horizontal bar chart" formats. More importantly, the mediating influence of the endowment effect on attributional inferences is moderated by the display formats of eWOM dispersion. The findings provide insights about how the different characteristics of the eWOM display formats affect consumers' product decisions.

4.2 Managerial Implications

This research offers new insights for online retailers facing eWOM dispersion into their products and/or service. First, retailers are advised to attach more importance to the role of pre-situational factors in consumers' attribution inferring of eWOM dispersion. Specifically, if the consistence of eWOM information is more difficult than ever to achieve, retailers can win over consumers' emotional attachment to a product by building a more user-

friendly platform, enriching product information, and establishing product appeal. Retailers may also benefit from highlighting that their products are available only within a limited time and volume and will soon be sold out. Such marketing strategies magnify the sense of possible loss of consumers and then strengthen consumers' endowment effects. Second, our investigation unveils that consumers' propensity to use mental imagery varies across product categories, such that they inherently have a distinct extent of feeling of ownership for products in different categories. And this feeling does not require actual ownership of a product, but rather a subjective sensation of owning it (Walasek et al. 2018). In particular, hedonic products are found to have higher mental imagery for consumers and consequently trigger a stronger endowment effect than utilitarian products. This means that retailers' clear product positioning should help the endowment effect to play its positive role. Finally, this research can also be applied to the design of better formats for displaying eWOM dispersion. As eWOM dispersion becomes a norm, retailers can adjust the display format of eWOM dispersion to provide consumers with more comprehensive and objective information. Based on our findings, compared with a "horizontal bar chart", "reviewers' impression of product" is a more favorable way to display high-dispersion eWOM in that it promotes product information elaboration. This finding provides important insights into management of eWOM dispersion from the perspective of its display format.

4.3 Limitations and Future Research

First, for the categorization of dispersion level, this research depicts low dispersion with low variance ($var < 1.0$) and high dispersion with high variance ($var > 8.0$) (He and Bond 2015, for the display in "horizontal bar

chart”). However, consumers may perceive dispersion level based on a subjective standard, which means that consumer evaluations of eWOM dispersion cannot be simply categorized as “low” or “high”. Future research is suggested to improve the principle for dividing the degree of eWOM dispersion. Second, the inclusion of display format of eWOM dispersion as a moderator in our framework highlights its potency in accounting for information processing and, in combination with product category, testifies the robustness of our conclusions. This finding awaits further research as to whether a longer period of exposure will result in a higher level of emotional attachment and feeling of ownership, deeper product information processing, and an enhanced endowment effect. Finally, research has suggested that the endowment effect of consumers differs across product categories (Chan and Eugene 2015). Consistent with this argument, we determine that consumers exhibit a stronger endowment effect for hedonic products than for utilitarian products. However, it may be possible that consumers have both hedonic and utilitarian needs for certain products (He and Bond 2015). Therefore, future research can refine the setting of product category in the experiment design to discuss a single product from both hedonic and utilitarian dimensions.

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