

Examining the role of emotion in online consumer reviews of various attributes in the surprise box shopping model

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ABSTRACT

The fierce competition among retailers demands the creation of new retail models. Emotional marketing aiming to arouse consumers' positive emotions attracts demand. In this context, the surprise box model, in which a business notifies consumers through a subscription and then mails boxes of new products without repetition, has emerged to rapidly develop. This study examines the role of consumer emotions in their online review writing behavior in the context of the surprise box shopping model. We find for the attributes of product, service, and fulfillment, but not for value; consumers tend to comment more in reviews when they have an extreme emotion, either positive or negative. Consumers comment even more when they have an extremely negative emotion than when they have an extremely positive emotion. In addition, we find that subscription period, experience, and consumers' overall satisfaction affect their review behavior, which depends on the particular attributes on which consumers comment. Further, we find that consumers' positive and negative emotions play different moderating roles in affecting the influence of the subscription period, subscription experience, and satisfaction on consumers' comments depending on the attribute types. This study helps firms understand how consumers perceive and evaluate various product and service attributes in the new surprise box business model. In this way, firms can better understand consumers' need to improve those attributes with different priorities. In addition, firms can use the positive electronic word-of-mouth effects generated from online consumer reviews to achieve both cognitive and affective empathy to attract future consumers.

1. Introduction

Competition between retailers has become fierce in the new retail era [45]. One of the biggest challenges that retailers face is creating an impression that will attract and retain consumers [40]. The key selling point or competitive advantage varies depending on the retailer and its choice of business model [7]. According to the cognitive-affective model, consumers' purchase decisions and behaviors depend on both the cognitive and affective sides [77]. Recently, a new business model, which in this study is called the "surprise box model," appears to have emerged rapidly. The surprise box model, as its name indicates, attracts consumers through their affective elements: that is, with the surprise box, the model aims to elicit positive emotions from consumers, particularly surprise.

Typically, the surprise box model is fulfilled through subscription. However, it differs from traditional subscriptions in several ways [78]. First, each surprise box, typically delivered once a month, contains different items each month, unlike traditional subscription boxes, which usually contain the same items each month. Second, rather than

knowing the contents of the subscription box beforehand, consumers do not know what to expect when they receive and open it—hence, the "surprise." Third, many retailers ask for consumers' preferences before they subscribe and customize each consumer's box accordingly. In the surprise box model, consumers' purchases are motivated not only by functional, tangible (i.e., product) and intangible (i.e., service) attributes but also by the emotions that this shopping model generates [85]. Therefore, consumer emotion is critical to the performance of the surprise box model.

Online reviews provide a platform where consumers can fully reveal their emotions and a window through which businesses can better understand consumers' needs and desires [80]. The electronic word-of-mouth (eWOM) effect generated by online consumer reviews can strongly influence future consumers in terms of affection and cognition, both of which affect their purchase intentions and behavior [15]. Thus, for firms, understanding how emotions affect consumers' online review writing behavior is a first step both in understanding surprise-box consumers and using the eWOM effect of their reviews to attract more demand.

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We extend our examination of consumer emotions from previous studies in four ways. First, consumers' emotions are neither absolutely positive or negative; rather, positive and negative emotions can coexist. This study examines how both positive and negative emotions affect consumers' online review writing behavior. In this study, consumers' online review behavior is reflected in the relevance of the review contents to each product or service attribute. Accordingly, we raise our first research question: what is the role of positive and negative emotions, respectively, in consumers' online review writing behavior?

Second, some consumers may be new to surprise boxes and may only have received one subscription box. Other consumers are repeat consumers who have been with the providers for a relatively long time and have received many subscription boxes. The role emotions play depends on how long consumers have been with a provider and on how many surprise boxes they have received. This is reflected in the changes in emotions with the vertical comparison of the boxes (from the same provider) as time goes by. That is, consumers' reaction to each box changes as they accumulate more and more boxes from the same provider. Thus, our second research question is: what is the role that positive and negative emotions play, respectively, in the influence of the subscription time on their online review behavior?

Third, various consumers may have different consumption experiences. Some consumers only subscribe to a surprise box from one retailer, while other consumers may have the consumption experience of subscribing to different boxes from various retailers. The role of emotions can change when consumers subscribe to various boxes from different providers. This reflects the emotional change with the horizontal comparison of the boxes offered from different providers. Therefore, we raise our third research question: what is the role that positive and negative emotions play, respectively, in the influence of the subscription experience on their online review behavior?

Last, because both cognition and affection influence consumers' online review behavior, we want to examine the interactions between satisfaction and emotions. Accordingly, we ask our fourth question: what is the role of satisfaction, and what are the interactions between satisfaction and positive and negative emotions, respectively, in consumers' online review behavior?

Although previous studies (e.g., [41,68]) have discussed the role of emotion in consumers' consumption perception and behavior, most of them, if not all, have focused on the traditional commercial market context and analyzed it from a static perspective. To fill in this gap in the literature, this study examines how emotions affect consumer online review-writing behavior regarding the surprise box model over time. This study's main contributions are as follows. First, this is one of the first studies to examine the roles of both positive and negative emotions in consumer online review-writing behavior regarding the surprise box shopping model. Second, we examine how consumers' emotions and their roles change vertically (based on subscription time) and horizontally (based on the consumption experience accumulated from various retailers). Further, we examine the effect of the interactions of cognition and affection on consumers' online review-writing behavior through revealing the different influence mechanisms of emotion, satisfaction, and subscription time and period as well as their interactions on consumer reviews of various attributes in the surprise box context.

2. Theoretical background and literature review

2.1. Theoretical background

This study's theoretical background is based on the mean-end chain theory (MECT; [25,92]). According to the MECT, consumers' subjective perception of the consumption is the result of the associations between its various attributes and their own personal elements [60]. Such associations determine the appeal of the consumption's features [66].

According to the MECT, regarding the various attributes, they reflect the properties and features of the consumption consumers expect

[49]. The attributes can be categorized as concrete versus abstract attributes [64]. In the surprising box model, product attributes can be categorized as concrete because the box and products included are tangible, whereas the service attributes can be categorized as abstract because they are intangible properties, which are relatively difficult to measure and verify prior to being involved in the information search, shopping, and consumption process [60].

Regarding consumers' personal elements, they play an important role to form their perception of the value of the consumption. These personal elements include both functional (i.e., cognitive) and psychological (i.e., affective) elements [29]. The functional elements reflect the benefits and cognitions obtained directly from the use of the products and services, which are reflected by consumer satisfaction toward the consumption. The functional elements are accumulated by the consumption time and experience [41]. Thus, in this study, we analyze the role of consumer satisfaction, subscription time, and subscription experience. For the psychological elements, they have more personal and intangible nature [29]. Emotion is one of the common expressions of consumers' psychology [13].

The MECT states that one of the most important motivations for consumers to purchase products or services is to obtain the perceived emotional benefits of those products or services [18]. Consumers purchase products and services for their various attributes [24]. Consumers expect and desire fulfillment from each attribute before consumption [26]. According to the expectation-disconfirmation model [59], consumers' positive cognition such as satisfaction and positive affection such as emotion generate when the perceived quality of product and service meets or exceeds their expectation. Otherwise, consumer dissatisfaction and negative emotion form.

The above rules are particularly true for surprise boxes because arousing positive emotions such as surprise is the selling point of the surprise box shopping model [23]. However, consumers' emotion can change over time depending on their subscription time (i.e., the time with the same provider, which indicates the number of boxes they receive from the same provider) and the subscription experience (i.e., their experience of receiving and consumption of various surprise boxes from different providers). Consumers' positive emotions, such as surprise and excitement, can be high for the initial consumption stage due to the perceived novelty and expectation beyond [59]. However, these surprise and excitement emotions can wane over time due to the reduced perceived novelty of the business model, increased perceived ordinary operations, and their familiarity toward both the products and the providers [23]. These can alter their subscription and the associated satisfaction, which is examined through the moderating role of emotion in this study.

In this study, armed with the MECT, we examine the relationship between the individuals' elements and consumer reviews of various attributes. In the theoretical framework of this study, we examine how consumers' individual elements, including both cognitive elements such as satisfaction and subscription time and experience and affective elements such as positive and negative emotion, affect their behavioral decisions. In this study, the behavioral decisions are reflected by consumers' review-writing behavior regarding the various attributes. These behavior decisions show consumers' instrumental values based on their cognition [59], emotion [67], and desired states (i.e., expectations; [55]).

2.2. Literature review

Emotion refers to the psychological processes and cognitive patterns that an individual derives from events or thoughts [13]. An individual can take specific actions to express emotion depending on the nature and meaning of the emotion and on the individual's purpose [86]. Consumers usually show emotions related to consumption through their online reviews [80].

Previous studies on consumer emotion have discussed the role of

emotions in consumer satisfaction (e.g., [44]). Some studies (e.g., [86]) examined consumer emotion in general, whereas others focused on specific types of emotions such as anger [33], empathy [35], shame [4], surprise [31], and delight [16]. Most of the studies described above discuss consumer emotion in the general setting of shopping and consumption. However, few studies, if any, investigate consumer emotion and its role in consumer evaluations of product and service attributes in a context where firms attempt, as marketing strategy or competitive advantage, to arouse consumer emotions related to positive consumption. This study fills this gap in the literature by focusing on the surprise box shopping model.

We examine the emotions of consumers through their online reviews. Previous studies (e.g., [22,69]) discuss how the emotions in online reviews affect consumer views of the reviews. Consumers evaluate reviews for their readership, helpfulness, and trustworthiness. Regarding readership, Salehan and Kim [69] studied the role of the title and the review's prevalent sentiment on review readership. They found that positive sentiments in reviews increased readership. In terms of helpfulness, Yin et al. [90] focused on two types of negative emotion—*anxiety* and *anger*. They found that *anxiety*-embedded reviews have a higher level of perceived helpfulness than *anger*-embedded reviews. For trustworthiness, Filieri [22] claimed that overly emotional elements in online reviews are often related to the subjective opinions of consumers; thus, those reviews are less trustworthy than reviews describing the facts from the consumption experience, which are viewed as more objective. In this study, we extend previous studies through examining the different roles of positive and negative emotion in consumers' review writing about various product and service attributes. In addition, we analyze how the role of emotion changes through the accumulation of subscription time and experience.

3. Hypotheses development

3.1. The impact of emotion on consumer reviews

One motivation for consumers to write and post reviews is to express emotions to meet psychological needs [52]. In addition, consumers tend to use those reviews embedded with their emotions to fulfill their social desires for interacting with other participants in the online community [91]. Thus, when they have an extreme emotion, consumers tend to write more reviews to describe and evaluate product and service attributes. When they feel a positive emotion, they tend to use more words to describe the advantages of the product and services [50]. In addition, they like to reveal their positive emotions by showing their delight and enjoyment in the consumption experience [36]. They also tend to commend the providers to encourage them to maintain good performance [61]. Consumers with positive emotions are more likely to recommend the product and services to future consumers through their reviews [50].

In the surprising box context, each subscription box is different and unknown before opening it. This novelty enhances consumers' positive emotions, such as surprise and excitement [85]. For the products, the surprise box stimulates the perceived fashion, which contains the component of surprise and is beyond consumers' expectations [19]. Thus, consumers have more psychological incentives to reveal their emotion and have social interactions through their online reviews with participants in the online community when they feel surprise [32]. They also tend to describe the source of their surprise in the online reviews and altruistically provide more information [14]. For the services, consumers are given more flexibility and have more choices of the customized products, so they often have more interactions with these providers than with providers in traditional markets. These interactions include submitting preferences and receiving recommendations from the providers and obtaining higher familiarity with or addressing concerns about the new model operations. These generate the hedonic feeling and perception of the shopping process and thus

generate consumers' positive emotion toward the services [41]. In this way, they have higher incentives to commend the providers through more detailed descriptions and evaluations of the providers' services [14]. Thus, based on the above discussions, this study proposes the following hypothesis:

H1a. : The more positive the emotion is, the more it intensifies the consumer's review of the product and service attributes.

When consumers feel more negative emotions, they tend to reveal their emotions to alleviate pressure and meet their psychological needs [43]. Consumers with more negative emotions tend to complain more to urge the providers to improve [74]. In addition, consumers with more negative emotions tend to describe more details of the product and service attributes to explain the reasons for their negative response and to seek empathy from other consumers [46].

The higher price and the associated costs increase consumers' expectations [26]. Thus, in the surprise box context, consumers' expectations on both the products and services are high because of the premium charge in the surprising box model compared with purchasing from the traditional market [85]. Therefore, from the product perspective, consumers are more likely to experience disappointment when the products are ordinary and low quality [47]. This stimulates their incentives to reveal their negative emotions and describe the reasons causing them in the online reviews [32]. From the service perspective, consumers have a high expectation for the convenience brought by the surprise box model through its subscription operations [19]. Thus, if the providers' responses to consumers' inquiries are slow or inappropriate or if the services attitude and behavior have a low performance, consumers are more likely to generate negative emotion and complain about and criticize the providers' services in their online reviews [24]. In this way, this study raises the following hypothesis:

H1b. : The more negative the emotion is, the more it intensifies the consumers' review of the product and service attributes.

3.2. The impact of subscription time on consumer reviews

Longer time with the provider make consumers more familiar with the provider's products and services, which gives them more incentive to evaluate product and service attributes in more detail [11]. Longer time with the provider also enhances consumers' loyalty toward the provider, which increases their incentives to spread eWOM and provide recommendation through writing more detailed reviews commenting on product and service attributes [65].

In terms of the surprise box model, consumers' longer time with the providers is achieved through the longer subscription period. This means from a product perspective, consumers receive more surprise boxes, which allows consumers to accumulate more knowledge about the products and services, which enhances their willingness to share [83]. From a services perspective, a longer subscription period increases the time consumers spend with a provider and strengthens the consumer's relationship with that provider, which motivates the consumer to evaluate the provider more comprehensively [79]. In addition, the longer subscription period increases the number of interactions with the providers and gives consumers more knowledge about the operations process of the surprise box, which enriches the information they would like to share in their online reviews [14]. Therefore, this study hypothesizes the following:

H2. The longer the subscription period lasts, the more the consumers' reviews of the product and service attributes are intensified.

3.3. The impact of subscription experience on consumer reviews

Consumption experience derived from different providers facilitates consumers' comparisons of different products and services, and thus

they tend to provide more detailed description and evaluation in their online reviews [94]. When consumption experiences from different providers accumulate in their review writing experiences, it becomes easier for consumers to alleviate the technical and psychological barriers against writing in more detail in their reviews [88]. Likewise, gaining more experience from different providers enhances consumers' self-image because they tend to view themselves as more expert in their commentary on the performance of the product or services, which encourages them to further evaluate the attributes [14].

In the surprise box model, the products and services offered by various providers have significant differences [85]. In terms of the product, the surprise boxes offered by different providers have high variety, which is reflected in the properties, quality, and packaging of the products [71]. Thus, consumers with more subscription experience have an overview of various boxes and can evaluate the strength and weakness of each product in a more comprehensive way from a comparative perspective in their online reviews [93]. In terms of the service, various providers offer different types of flexibilities for receiving and returning products, different channels for consumers to interact with them, and different customizations and recommendations [2]. Thus, the subscription experience helps consumers find the services that fit their needs and wants, and it compares the service performance among different providers [19]. This motivates consumers to offer more detailed evaluations of providers in their online reviews. Based on the preceding discussion, this study raises the following hypothesis:

H3. The more consumption experiences the consumer gains, the more the review of the product and service attributes intensifies.

3.4. The impact of overall satisfaction on consumer reviews

Higher satisfaction gives consumers more incentive to describe product and service attributes in more detail because they want to commend the providers and encourage them to continue to perform those attributes well [32]. Higher satisfaction also encourages consumers to explore why they are satisfied, and they attempt to convince their fellow consumers of their satisfaction by evaluating the attributes of products and services in a more comprehensive way [65]. Consumers' higher satisfaction generates more loyalty toward the providers, which gives consumers more incentive to spread electronic word of mouth through online reviews [63].

In the surprise box model, consumers receive products and services through subscription, which is a repeat purchase process with a relatively long-term relationship with the providers. Thus, a higher satisfaction level enhances consumers' incentive to commend the providers and encourage them to continue their good product and service performance [61]. They would also use more detailed positive evaluations to show they are in favor of the providers and want to strengthen the long-term buyer-supplier relationship [79]. In the surprise box model, because of the high level of uniqueness and variety of products and services, consumers' satisfaction can come from different sources. In terms of the products, both the high functional quality and utilitarian values of the products and high hedonic values from the appeal, package, and fashion of the products increase consumer satisfaction [85]. In terms of the service, the flexibility, convenience, novelty, and customized services such as recommendation and staffs' positive attitude and behavior, such as a quick response, can enhance consumer satisfaction [71]. Thus, satisfied consumers utilize many details about the various reasons for their satisfaction with the products and services in the surprise box model, and they want to share them with the providers and other participants in the online community through their reviews. Therefore, this study proposes the following hypothesis:

H4. Higher overall satisfaction intensifies the consumers' reviews of the product and service attributes.

3.5. The moderating role of emotion in effect of subscription time on reviews

When consumers experience a strong positive emotion, the more time they spend with the providers the more they are encouraged to interact intensively with other consumers by including more details in the reviews as commentary on the various attributes in expectation of receiving feedback from the providers [70]. This strong emotion causes consumers to discount the time cost in writing the reviews after they have been receiving the subscription for a while [34]. Thus, they value the products and services offered during the long run, which is reflected by their detailed reviews [51].

In the surprise box model, consumers maintained a positive emotion over time based on the providers' efforts in terms of product and service aspects. From a product aspect, when consumers' positive emotion is high, spending more time with the providers can facilitate their finding more unique and novel features of each surprise box [5]. From a service aspect, consumers' strong positive emotion increases their willingness to adopt more varieties of services offered in the surprise box model and to keep a strengthened long-term relationship with the providers [71]. These help consumers retain their positive memory of the consumption over time, which stimulates consumers to provide a more detailed review online [31]. Thus, we hypothesize the following:

H5a. The more positive the emotion is, the more it enhances the positive influence of the subscription period on the consumers' reviews of product and service attributes.

When consumers experience an extremely negative emotion, they tend to feel more regret about the consumption experience and about having been with the provider for a longer time [8]. Thus, they tend to describe and comment more about faults in the product or service attributes [43]. As a classical type of affection, negative emotion is short-lived compared with cognition [72]. Thus, the accumulation of negative emotions after a long time spent with providers tends to generate frustration and the need for consumers to release those emotions through online reviews [14].

In the surprise box model, consumers' feelings of excitement and surprise can spike initially but wane over time when the subscription period accumulates. From a product aspect, the weaknesses of the products can be amplified over time [93]. From a service aspect, their concern can be about the operations features because they become more ordinary when consumers have longer subscription periods [31]. In this way, consumers' negative emotions, such as disappointment, are generated and tend to make them complain about more details about the products and services in their online reviews [58]. Based on the above discussion, this study hypothesizes the following:

H5b. The more negative the emotion is, the more it enhances the positive influence of the subscription period on consumers' reviews of product and service attributes.

3.6. The moderating role of emotion in effect of subscription experience on reviews

When consumers experience a strong positive emotion, they have more incentive to compare the products and services from different providers and comment on them [82]. The consumers' strong positive emotion makes these comparisons relatively more subjective [53]. In this way, consumers are more willing to review and comment in more detail to provide information for future consumers for altruistic purposes [14]. The positive emotion encourages them to provide a more comprehensive review based on their prior reviews and consumption experiences to receive more votes for being helpful and trustworthy from other participants in the online community [90].

Particularly, in the surprise box model, the positive emotion increases their curiosity and willingness to attempt to adopt more surprise boxes from other providers [5], which stimulates them to make a more

comprehensive comparison about different products and providers and the services they offer [94]. In this way, they have a greater incentive to write reviews to compare the attributes offered by various providers. Thus, we raise the following hypothesis:

H6a. : The more positive the emotion is, the more it enhances the positive influence of the consumption experience on consumers' reviews of product and service attributes.

When consumers feel a negative emotion, they have more incentive to release it in their reviews by complaining about the cons of the products and services after comparing them with those of other providers [81]. Consumers' strong negative emotions amplify the perceived faults of the products and services, which causes them to focus in on commenting about those attributes that do not meet their expectations [42]. This strong negative emotion makes consumers more confident in criticizing the providers after a comparison with the performance of various other providers [58]. Their reviews largely demonstrate these negative emotions and criticisms.

In the surprise box model, consumers' negative emotions can be aroused by a gap between their expectation and the perceived performance of the product or service [59]. This gap is enlarged when the providers charge a premium compared with traditional models for their product and service [26]. In addition, this gap is amplified when consumers have more subscription experiences and can compare among different products and services [94]. On the product side, the gap can include both the functional and hedonic values, and on the service side, it can include how providers help consumers adopt the business model, acquire the product, and handle their concerns [41]. Because the surprise box is emerging and still in its early stage, consumers are more likely to experience difficulties in adapting themselves to the model [5]. Thus, more negative emotions are likely to accumulate when they have more subscription experiences, and the downsides of the products and providers can be amplified when consumers compare different subscription experiences [94]. All these aspects stimulate consumers to reveal their descriptions and evaluations of the product and service attributes in their online reviews. Therefore, we hypothesize the following:

H6b. : The more negative the emotion is, the more it enhances the positive influence of the consumption experience on consumers' reviews of product and service attributes.

3.7. The moderating role of emotion in effect of satisfaction on reviews

Consumers' decisions and behavior are the consequences of both their cognition and affection [77]. When the cognition and affection align with each other, the positive effect is amplified [10]. Thus, when consumers feel strong positive emotions, their strong satisfaction

stimulates them to write their reviews in detail to commend providers and show their satisfaction and delight with their consumption [62]. The positive emotion facilitates their satisfaction, and vice versa, which is reflected by their motivation to write more detailed positive reviews [69].

In the surprise box model, positive emotions can be aroused from the product side, such as the fashion and functionality of the products, or from the service side, such as the hedonic shopping process facilitated by the providers' customized and unique services [41]. The surprise is one of the most typical reflections of positive emotion in the surprise box model, which largely increases arousal through faster heart and respiration rates [31]. This encourages consumers to focus their attention on the surprise stimulus [57], and this reaction can be transferred to deeper cognitive processing arousing positive satisfaction [54]. In this way, consumers are encouraged to exhibit more behavior expressions and actions through writing online reviews to commend the product and provider [61]. Thus, we propose the following hypothesis in this study:

H7a. : The more positive the emotion is, the more it enhances the positive influence of overall satisfaction on consumers' reviews of product and service attributes.

When consumers' affection and cognition do not align with each other, the effect of affection and cognition on their decisions and behavior is reduced [38]. If consumers are feeling strong negative emotions even though they are satisfied with the product and service attributes, they are less likely to describe much in their reviews because of their low enthusiasm [61]. The strong negative emotion causes consumers to care more about the time and trouble of writing and posting online reviews (Cheung & Lee., 2012). This motivates them to pay more attention to the cost side of the consumption and the review writing process, rather than to the benefits [89]. The higher perceived transaction costs give them less incentive to write more detailed reviews.

Particularly in the surprise box model, consumers care more about the fashion and quality of products and convenience, and they have high expectations for providers to provide customized solutions to address their concerns both before and after sales. Thus, when consumers have negative emotions, they place less value on the cognitive evaluation of the product and service [28]. In this way, the inconvenience and hassle of writing online reviews are amplified, which frees them to reveal their cognitive evaluation even if they are satisfied [14]. Therefore, we hypothesize the following:

H7b. : The more negative the emotion is, the more it reduces the positive influence of overall satisfaction on consumers' reviews of product and service attributes.

Fig. 1 presents this study's conceptual framework. As Fig. 1 shows,

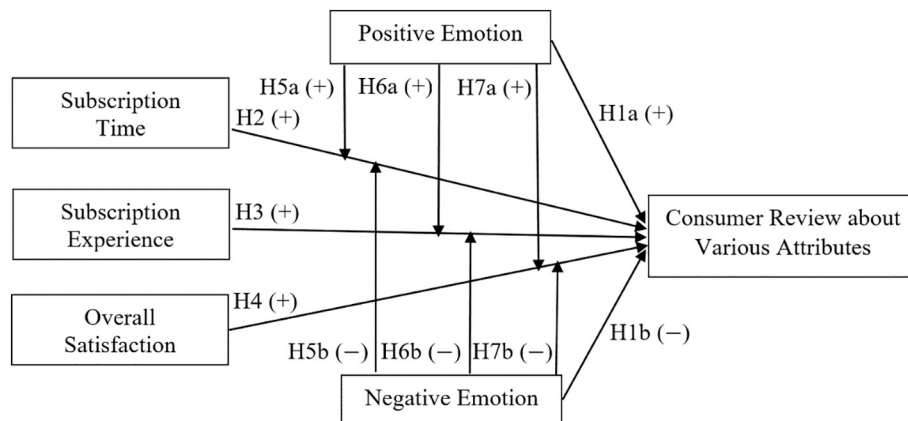


Fig. 1. The Conceptual Framework of This Study.

this study focuses on consumers' online review-writing behavior. Particularly, we concentrated on the factors influencing the content focus of consumer reviews on the various attributes such as product or service in the surprise box model. Previous studies (e.g., [9,37]) have found consumer reviews can reflect their satisfaction of the consumption experience. It is possible that consumers with various satisfaction levels have different review-writing behaviors [3]. In addition, the content of online reviews also depends on many other factors such as consumers' motives [75], shopping experiences [20], and demographic characteristics [17]. This study examines how the three types of factors affect consumer review focus on various attributes. We test three types of direct effects regarding consumers' subscription experience – subscription time, subscription experience, and satisfaction on their review behavior. In addition, given the important role of emotion on affecting consumers' shopping perception and experience in the surprise box model [85], we examine the moderating role of emotion in affecting consumers' review behavior.

4. Data analytics

4.1. Data collection

We collected data from [Cratejoy.com](https://www.cratejoy.com), one of the largest e-commerce platforms for subscription box businesses. To control the impact of retail industries, we narrowed down our data collection scope to the beauty industry, which previous studies have considered one of the most popular industries to adopt the surprise box model (e.g., [85]). For each review, we collected the overall rating score, the textual comments, the number of days (or months or years) of subscription, and the number of reviews posted by the consumer. We excluded reviews if one or more of the above data were missing, which resulted in the retention of 6138 reviews. All the reviews we collected are from consumers whom Cratejoy verified to have made purchases.

4.2. Data analytics

Online reviews give consumers a full opportunity to describe their consumption experience, express their emotions, and evaluate the product, service, and providers. In this way, the open form of online reviews can facilitate more information gathering and more accurate measurement than closed-ended survey questions because the fixed alternative responses in surveys may confound the data [84]. However, the open form and large number of online reviews also has a downside, which is reflected by information overloading issues [61]. Thus, traditional text data analysis methodologies such as content analysis may not work well—and may not work at all—for examining online reviews because they are too time-consuming. In this study, we used a text-mining approach, latent semantic analysis (LSA), to analyze the text data. LSA has particular strengths for dealing with human natural languages because it can extract the hidden semantic structures of words and sentences from the online reviews, and thus it has been used in previous studies (e.g., [39,87]).

Following previous studies (e.g., [39]), we conducted LSA in three steps, using RapidMiner software to find the latent text factors. The principle of LSA is to cluster factors mathematically, much like numerical factor analysis [21]. The first step is text data preprocessing. In this step, we first transferred all letters into lowercase and removed all trivial words. In this way, we avoided the unnecessary inflation of the term frequency matrix to save computational time. The trivial words included all words that do not provide a virtual meaning, such as “the” and “are,” and all tokens with fewer than two letters, such as “s” and “x.” Then, we used term-stemming techniques to identify words that have the same roots to consider them as one word. For example, the words “surprise,” “surprised,” and “surprising” have the same roots and thus are considered one word. Last, we implemented the n -gram algorithm by setting n equals to 3 to identify phrases containing three words

or fewer such as “nice product,” “customer service,” and “great value.”

For LSA, the second step is the transformation of the term frequency matrix. In this step, we input all documents into the term frequency matrix using the term frequency-inverse document frequency (TF-IDF) weighting method [30]. TF-IDF is one of the most commonly used term-weighting methods in natural language processing (Zhang et al. 2011). The function of this step is to assign more weight to rare terms and to discount common terms. In this way, the uniqueness of each document, rather than the commonalities, can appear [73]. In detail, the term frequency (tf_{ij}) is calculated using the equation of $tf_{ij} = \frac{n_{ij}}{n_j}$, where n_{ij} is the number of occurrences of token i in document j , and n_j is the total number of tokens in the document j . The inverse document frequency is calculated by the equation of $idf_i = \log\left(\frac{N}{df_i}\right)$, where N represents the total number of documents in the database, and df_i shows the frequency of documents that contain the token i . In this way, the transformed term-frequency matrix contains the weights w_{ij} , where $w_{ij} = tf_{ij} \times idf_i$.

In the third step of LSA, we followed previous studies (e.g., [1,6,27]) to conduct singular value decomposition (SVD). The SVD of matrix A is the factorization of A into the product of three matrices: an orthogonal matrix U , a diagonal matrix S , and the transpose of an orthogonal matrix V . That is, $A_{nd} = U_{nm}S_{nd}V_{dd}^T$, where $U^T U = I$ and $V^T V = I$. The columns of V are orthonormal eigenvectors of $A^T A$; the columns of U are orthonormal eigenvectors of AA^T ; and S is a diagonal $n \times d$ matrix containing the square roots of eigenvalues from U or V in a descending order. The three matrices are the term-by-factor matrix, which shows the terms' loading on a particular latent factor; the document-by-factor matrix, which reflects the document connection to a particular latent factor through its loading; and the singular value matrix, which indicates a particular latent factor's importance.

In the SVD, we treated the matrix A as an $n \times d$ matrix, where n points in a d -dimensional space, and considered the problem of finding the optimal k -dimensional subspace with respect to the set of points. The optimal k -dimensional subspace is to minimize the sum of the squares of the perpendicular distances of the points to the subspace. Following the procedures from previous studies (e.g., [27]), we found the optimal subspaces of every dimension through using the best least squares fit algorithms. In detail, we started with the one-dimensional subspace using a line through the origin. To minimize the sum of the squared distances from the points to the line, we figured out the optimal fitting line through the origin with respect to a set of points $\{x_i | 1 \leq i \leq n\}$ in the plane. In this way, we found the best-fitting k -dimensional subspace through k applications of the above best-fitting line algorithms.

After finding the latent text factors from LSA, we analyzed the reviews' textual vector space on each latent factor and implemented text regressions following previous studies (e.g., [56]). The dependent variable is the coordinate value of each review on each latent factor. Technically, each review is considered as a vector in the multi-dimensional space, and a higher coordinate value on a certain dimension (i.e., axis) shows that the review has a higher loading on the corresponding latent textual factor, which is reflected by the axis in the space. Practically, the higher coordinate value shows that the review has more relevance for and focus on that textual factor through a more detailed description and evaluation of that factor, which can be considered as an attribute. For example, if a review has a high coordinate value on the textual factor of “product,” it means the contents of this review is highly relevant to consumers' description and evaluation of the product attribute, as reflected by the tokens (e.g., the words and phrases) in the reviews.

The independent variables include the consumer's overall rating, the sentiment of the review, the time period of the subscription when writing the review, and the surprise box subscription experience. In detail, the consumer's overall rating is a number ranging from 1 to 5 that represents the consumer's overall satisfaction. The sentiment of a review shows a consumer's emotions and was calculated based on the

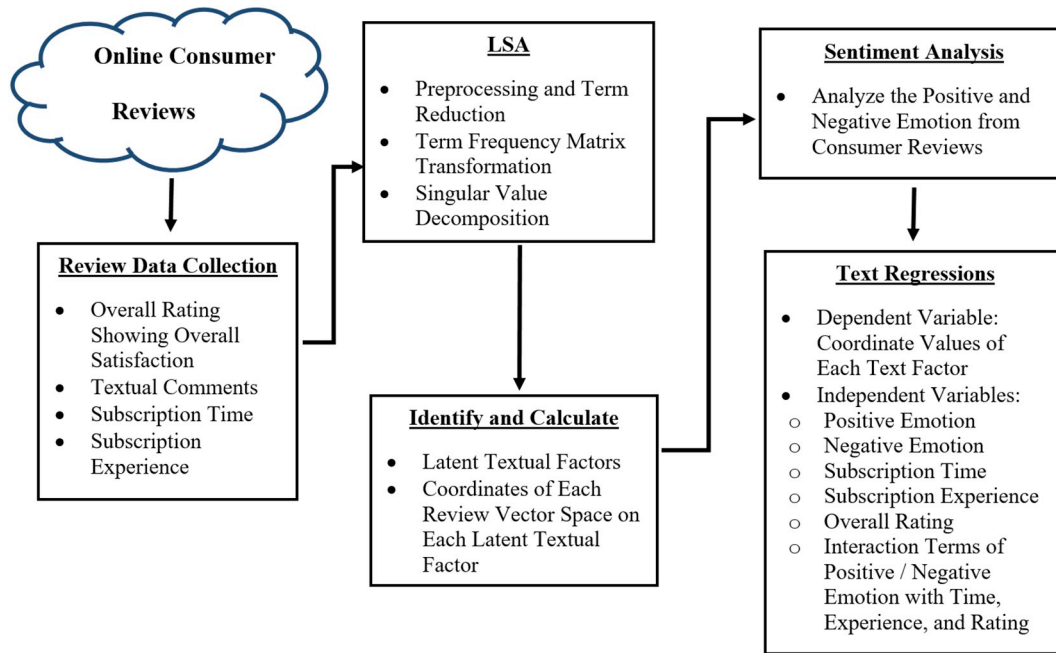


Fig. 2. The Data Analytics Procedure of This Study.

sentiment polarity using SentiStrength software following previous studies (e.g., [12,48]). Both the negative sentiment, from -5 to -1 , and the positive sentiment, from 1 to 5 , were calculated. The lower value shows that the consumer's emotion is more negative, and the higher value shows that the emotion is more positive. Negative sentiments include anger, anxiety, and frustration. Positive sentiments include delight, excitement, and surprise. The subscription period was measured by the number of surprise boxes received through subscription. Typically, the surprise box was sent monthly. Thus, a subscription period of less than a month indicates that the consumer received the surprise box once, and more than a month indicates that the consumer received the surprise box more than once. Last, the surprise box subscription experience reflects how many different surprise boxes from different providers the consumer has received. This was measured by the number of reviews about various surprise boxes that the consumer has written. We virtually present the data analytics produced by this study in Fig. 2.

5. Results

5.1. Textual factors of consumer reviews

We used LSA to extract text factors from consumer reviews about the surprise boxes and found four text factors: product, service, fulfillment, and value. For each factor, we present the top ten high-loading terms for demonstration purposes in Table 1.

According to Table 1, for the product factor, consumers often describe the products and evaluate their quality. For the service factor, consumers describe and evaluate the services, including services before, during, and after the sale. The presale services include receiving

recommendations and customization from the firms; services during the sale include communication and interactions with the staff, along with the box and product packaging, whereas the after-sales services include the return and refund process. The factor of fulfillment mainly refers to the order processing and subscription box delivery process. Last, for the factor of value, consumers comment on the value and price of the boxes.

5.2. Text regression results

We used text regressions to investigate the impact of overall satisfaction, sentiment, subscription time, and experience on consumer reviews of each of the attributes. In addition, we examined the moderating role of sentiment on the influences of satisfaction, time, and experience on consumer reviews. The results of standardized coefficients are reported in Table 2. We discuss the results in the following subsections.

5.2.1. The influence of emotion on reviews

The results in Table 2 partially support hypothesis 1a. We find for the attributes of product, service, and fulfillment that the more positive an emotion is, the more it intensifies consumers' reviews of those attributes. This shows that positive emotions facilitate the consumers' motivation to describe the pros and commend the surprise-box provider. However, we find that the influence of positive emotion on consumer reviews of value is not significant. This is because value is often related to price, which is often listed on the subscription webpage and is relatively objective. Thus, consumers' positive emotions do not stimulate their motivation to praise the value. They tend to let future consumers refer to the listed price directly and instead use their

Table 1
Textual factors of online consumer reviews.

Factors	Interpretations (Labels)	High-Loading Terms
Factor 1	Product	goodie, stuff, items_inside_box, product, gift_item, cosmetics, new_thing, goods, fun_stuff, quality_product
Factor 2	Service	staff, customiz_, customer_servic, return, respons, talk_staff, ask, recommend_staff, staff_servic, pack
Factor 3	Fulfillment	mail, period, deliver, track_notifi, sent, receive_box, subscrip, wait, get_box, order
Factor 4	Value	save, monei, promot, discount, off, cheap, afford, worth, valu, price

Table 2
Text regression results.

Variable	Product	Service	Fulfillment	Value
Positive Emotion	0.297***	0.268***	0.284***	0.035
Negative Emotion	−0.312***	−0.287***	−0.291***	−0.153***
Time	0.144***	0.127***	−0.105**	0.182***
Experience	0.098**	0.048	0.055	0.109***
Satisfaction	0.052	0.049	0.112***	0.058
Positive Emotion × Time	0.082**	0.091**	0.046	0.113***
Positive Emotion × Experience	0.215***	0.052	0.049	0.204***
Positive Emotion × Satisfaction	0.279***	0.254***	0.237***	0.047
Negative Emotion × Time	−0.086**	0.037	0.089**	−0.105***
Negative Emotion × Experience	−0.237***	0.054	0.096**	−0.188***
Negative Emotion × Satisfaction	0.194***	0.216***	0.145***	0.093**

Remark: *p < 0.1; **p < 0.05; ***p < 0.01.

commendation of the pros of other attributes to indicate the high value of the surprise box.

Our results fully support hypothesis 1b. We find that for all of the attributes, the negative emotion stimulates consumers to comment more in their reviews. Consumers write and post reviews to express their negative emotions to meet their psychological needs. They also describe and evaluate the cons of each attribute in the surprising box model in detail to convince others of their reasons for their strong negative emotion. Further, we assert that for all four attributes, the impact of negative emotion on online reviews is higher than the effect of positive emotion. This shows that consumers complain more about the attributes when they are frustrated or angry than they commend the attributes when they are delighted or surprised.

5.2.2. The influence of subscription time on reviews

From Table 2, we find that longer subscription times positively affect consumer reviews regarding product, service, and value but negatively influence their reviews regarding fulfillment. This partially supports hypothesis 2. Product is the core attribute that drives consumers to adopt surprising box model. Thus, with the passage of time, the effect of product quality on consumers' perception is amplified, which motivates consumers to comment more. The product acquisition is interrelated with the service process, because consumers need to communicate with the providers more as time goes by, particularly in the surprising box model because consumers have lower familiarity toward the operational process compared with in the traditional market. In addition, the package service is often valued by consumers. Thus, when consumers spend more time with the providers, the supplier–buyer relationship is strengthened, particularly in the subscription mode, which encourages consumers to comment more. When they have received more subscription boxes over time, consumers perceive higher value, which motivates them to comment more about value in their reviews. However, we find that longer subscription times reduce the consumers' comments on the attribute of fulfillment. This is because, with more boxes received, consumers perceive the fulfillment process as more standardized and ordinary, which reduces their incentive to comment.

5.2.3. The influence of subscription experience on reviews

Our results partially support hypothesis 3. We find that with more subscription experience from various retailers, consumers tend to comment more on the products and the value than on the service and fulfillment. This shows that consumers mainly compare the products in different surprise boxes from various providers and comment on their function and aesthetics, because the product is the core attribute of their purchase. The comparison between different providers and the

associated surprise boxes also enhances consumers' perception of the value. This is because it is easier for consumers to conduct the comparative cost-benefit analysis when they have multiple boxes from various providers. However, we find that more subscription experience does not cause consumers to comment more on service and fulfillment. This is because, compared with the product and value of the surprise boxes, which have higher levels of uniqueness and variety between the products and providers, the service and fulfillment process is relatively standard. Thus, the comments do not increase with consumers' greater subscription experience.

5.2.4. The influence of satisfaction on reviews

The results in Table 2 partially support hypothesis 4. We find that higher satisfaction only motivates consumers' comments on fulfillment. This is because one of the creative aspects of the surprise box shopping model is the fulfillment process. The fulfillment process is relatively less transparent than the traditional e-commerce model. The pros of the fulfillment process—its creative ideas, innovative operational modes, and generation of feelings of surprise—bring additional benefits for consumers. Thus, higher satisfaction motivates consumers to describe and commend more of the fulfillment process to express their satisfaction and provide information for the reference of future consumers. However, we find that consumers' higher satisfaction does not lead to more comments on the attributes of product, service, and value. The possible reasons are that, for the attributes of product and service, although satisfied consumers like to comment more, so do dissatisfied consumers. Both the highly satisfied and dissatisfied consumers claim strong reasons and share details of their evaluations of the product and service attributes with the online community. This renders insignificant the relationship between satisfaction and the attributes of product and service. Consumers' satisfaction mainly depends on their expectation and the perceived quality of the consumption, which is not directly related to the value. Thus, the relationship between satisfaction and comments on value is not significant.

5.2.5. The moderating role of emotion on the effect of subscription time on comments

We find that our results partially support hypothesis 5a. Consumers' positive emotions positively affect the influence of subscription time on their comments on product, service, and value. This is because positive emotion amplifies their willingness to maintain a longer-term relationship with the providers and continue to receive their product and service. In this way, the perceived value is enhanced. However, we find for the attribute of fulfillment, the impact is not significant. This is because consumers may get used to the fulfillment process of the surprise box as time goes on. Thus, even though they feel strong positive emotions, they are not more motivated to comment.

In addition, we find that consumers' negative emotions increase their comments on product and value when subscription time has accumulated but reduce their comments on fulfillment and have no significant relationship with the attribute of service. This partially supports hypothesis 5b. Extreme negative emotions accumulate as consumers spend more time with the retailer, which causes them to complain about the products and their low value. However, over time, consumers come to feel that the fulfillment process has become more standardized, so that those who experience strong negative emotion tend not to focus on it. The strong negative emotion accumulated over time is mainly aroused by the products and value. When consumers have the strong negative emotions about the retailers, they have low motivation to interact with the retailers actively, which makes the relationship insignificant.

5.2.6. The moderating role of emotion on the effect of subscription experience on comments

The results in Table 2 partially support hypothesis 6a. We find that positive emotion increases the effect of the subscription experience on

consumers' comments on product and value. This is because the high positive emotion makes consumers more willing to compare the products and value of different providers, and so they comment more on these attributes. However, we find that for the attributes of service and fulfillment, the moderating role of positive emotion is not significant. This is because the attributes of service and fulfillment are relatively auxiliary compared with the core attributes of product, and thus consumers have less motivation to make comparisons and comment on them when they subscribe to different boxes.

Negative emotions enhance the effect of the subscription experience on consumers' comments on product and value. The negative emotion generated from the comparison of various boxes strengthens consumers' beliefs that the product and value indeed perform poorly, which motivates them to complain more. However, for the attribute of fulfillment, because the similarity of the fulfillment process among various retailers is relatively high, the effect of negative emotion is alleviated when consumers comment on fulfillment. Consumers are less willing to interact with retailers and care less about the service if the products do not meet their expectations. This makes the service attribute effect insignificant.

5.2.7. The moderating role of emotion on the effect of overall satisfaction on comments

Our results partially support hypothesis 7a and fully support hypothesis 7b. We find that except for the attribute of value, positive emotion enhances and negative emotion reduces the impact of consumers' overall satisfaction on their comments about the attributes. We also find that when the cognitive side (i.e., satisfaction) and affective side (i.e., emotion) are aligned, the joint effect of satisfaction and emotion on consumer reviews is amplified. Otherwise, the joint effect is diminished. For the attribute of value, we find that positive emotion does not increase the effect of satisfaction on consumer comments. This is because the value is directly related to price, which is listed on the website and thus is relatively objective. In this way, consumers'

comments are less influenced by their cognition and affection.

Fig. 3 visually summarizes the above findings and shows the impact of positive and negative emotions on consumers' comments about each attribute of product (Fig. 3a), service (Fig. 3b), fulfillment (Fig. 3c), and value (Fig. 3d), along with the moderating effects. The factors that make the slope of the curve steeper enhance the effects of the comments on that particular attribute. When factors make the slope flatter, this reflects the reduced effects on the comments of that particular attribute. All U-shape curves in Fig. 3 are asymmetric. This shows that consumers' negative emotions have a stronger influence than positive emotions on their comments on each attribute, as is illustrated by the fact that the slope of the negative emotion curve (blue) is higher than the slope of the positive emotion curve (red).

6. Discussion

6.1. Theoretical implications

The findings of this study support the MECT [25,60], which emphasizes the role of consumer emotion in consumer behavior, particularly online review-writing behavior, including the comments on each product and service attribute in the surprise box context. Specifically, this study offers the following three theoretical contributions.

First, although previous studies (e.g., [41,68]) have focused on the role of emotion on consumers' consumption perception and behavior in the traditional commercial market, very few studies, if any, have examined the impact of consumer emotion on their review-writing behavior in the surprise box model, which is the scope of this study. One of the key differences between the surprise box model and the traditional model lies in the designed target element of surprise as a positive emotion in the model. The surprise can come from the fashion of the products, a hedonic shopping process, unique operations, or customized services offered by the providers. That is, arousing surprise becomes the providers' competitive advantage and the highlight of the product.

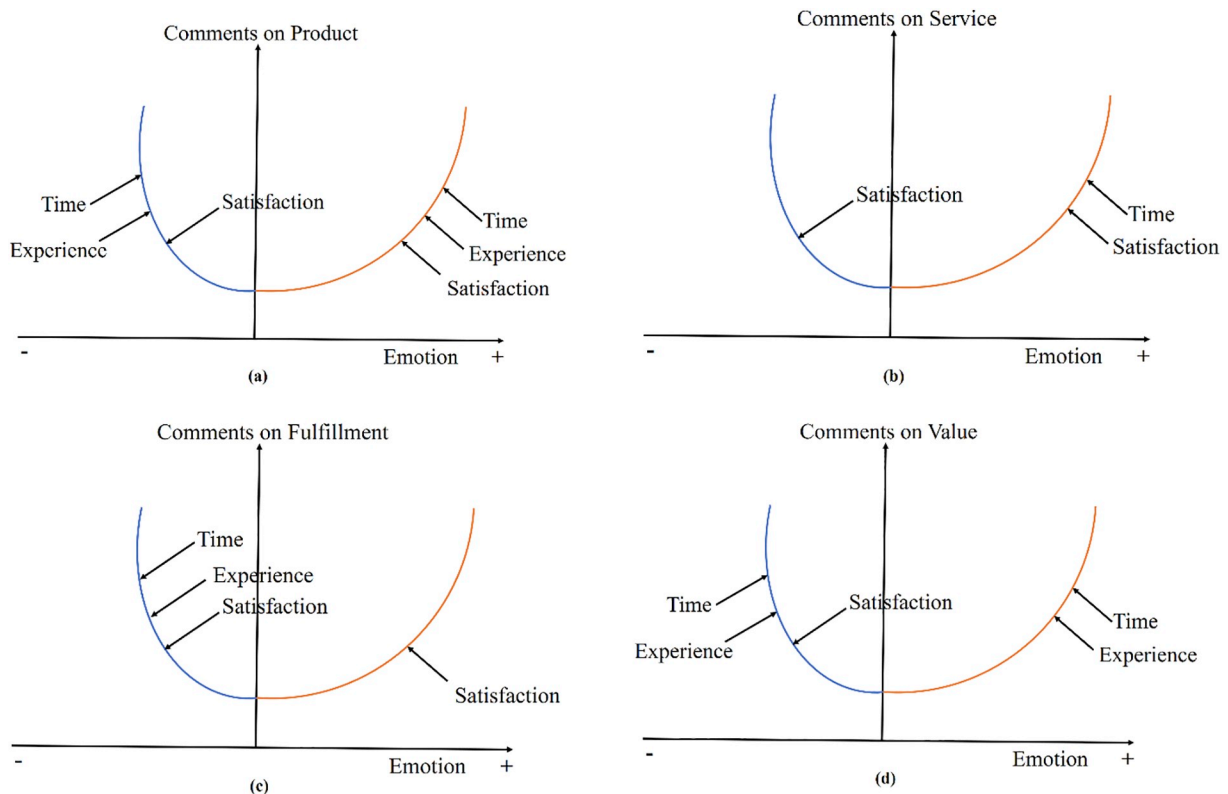


Fig. 3. The Relationship between Positive and Negative Emotion and Consumer Comments on Each Attribute Considering the Moderating Effects.

However, the incorporated surprise elements increase consumers' expectation of the positive perceptions, which are also likely to generate negative emotions such as disappointment when expectations are not met. This study thus examines the role of consumers' positive and negative emotions on their review behaviors. We find both positive and negative emotions increase consumers' comments on attributes regarding product, service, and fulfillment, and negative emotions have an even larger effect.

Second, most of the previous studies (e.g., [63,86]) have discussed the role of consumer emotion from a static perspective. The surprise box model is operated through subscription, and thus, in this study, we focus on the change process of emotion over time in the model. In detail, we find that the role of emotion in consumers' comments on various attributes can change in two dimensions over time based on accumulation. One dimension is the accumulation of purchases over time in the subscription period. When the subscription period is longer, it means that the consumers have been with the retailers longer and that more surprise boxes have been received. This dimension indicates consumers' comparisons of the surprise boxes with the same retailer over time. We refer to this as the *vertical comparison*. We find that the subscription period affects consumers' review behavior on each attribute and that their emotion influences this effect. The other dimension is the accumulation of varied subscription experiences. More experiences mean that consumers have ordered more subscriptions from different retailers and have written more reviews. In this dimension, consumers compare various surprise boxes from different retailers, and thus, we refer to this as a *horizontal comparison*. We find that the subscription periods affect consumers' review behavior of each attribute and that consumers' positive and negative emotions influence this effect.

Third, previous studies about consumers' online review behaviors often focused on either the cognitive side, such as the reflection of satisfaction (e.g., [20]), or the affective side, such as consumers' sentiment (e.g., [50]). This study bridges these two categories of studies by analyzing the mechanism of how cognition (i.e., satisfaction), affection (i.e., emotion), and their interactions affect consumers' review behavior. We find that the positive interaction of cognition and affection enhances consumers' incentives to comment; otherwise, the negative interaction leaves consumers unmotivated to comment. In addition, we differentiate the various attributes, including product, service, fulfillment, and value, through the mechanisms of how they are commented on by consumers' different cognition and emotion over time. This reflects how consumers value these attributes and their changed perception over time in the surprise box model.

6.2. Managerial implications

The intention for the surprise box shopping model was to arouse consumers' positive emotions, such as surprise, when they open the subscription box. The open structure of online reviews provides a full opportunity for firms to understand consumers' emotions. Many managers focus only on the contents of consumers' online reviews without paying attention to the emotions that the reviews reveal. One typical motivation for consumers to write reviews is to express their emotions to meet psychological needs. This is particularly true for the surprise box shipping model, which uses affection as a marketing strategy.

Managers should understand the important role of consumer emotion in the description and evaluation of the various product and service attributes in their online reviews. Although the intention behind the surprise box model was to arouse consumers' positive emotions, managers should be aware that positive and negative emotions can coexist. Consumers can feel positive emotions toward the fulfillment process when they open the box but feel negative emotions when using the product. Thus, managers should understand consumers' mixed feelings and their determiners. In particular, because the effect of negative emotion on consumer reviews is even higher than that of positive

emotion, managers should pay more attention to the negative-emotion consumers, so that improved products and services may alleviate their anger or anxiety. In this way, managers can guide consumers' emotions in a more positive direction, which motivates consumers to commend various attributes and spread the positive eWOM effect.

In addition, firms must differentiate the perceptions of consumers who are new to the surprise box shopping model from the perceptions of repeat consumers. They should also distinguish repeat consumers who subscribe to boxes sent by the same provider from repeat consumers who subscribe to boxes from different providers. Both a longer time with the same provider and a subscription experience with various providers affect consumers' comments. Consumers' positive and negative emotions also influence this effect. Consumer emotion is often considered temporary affect. However, firms should notice that with the passage of time and the accumulation of consumption experience, consumers' emotions and their role in affecting consumers' comments alter. Thus, firms should acknowledge the interactions between emotions and the subscription period and the variety of experience.

Further, firms should notice that online consumer reviews are the consequence of cognition and affection in combination. Consumers' comments on various attributes reflect their satisfaction and emotions. Enhancing consumers' overall satisfaction and positive emotions while alleviating their negative emotions can facilitate more positive descriptions of the attributes and the retailers. Given limited resources, firms should set priorities to improve the attributes that influence consumers' emotions and satisfaction the most. In this way, firms can be more efficient in satisfying current consumers' desires and attracting future consumers through the eWOM generated from online reviews.

7. Conclusions and future research directions

7.1. Conclusions

This study examines the role of the emotions of consumers in their online review writing behavior in the context of the surprise box shopping model. The highlight of the surprise box model is its emotional marketing, which is attractive because it arouses positive emotions such as surprise. We find that emotion indeed plays an important role in affecting consumers' online review behavior regarding product and service attributes. In detail, for all the attributes except value, both positive and negative emotions enhance consumers' comments on attributes regarding product, service, and fulfillment. Comparatively, we find that the influence of negative emotion on comments is even higher than the impact of positive emotion. This reflects the consumers' intention to complain about attributes when they are frustrated or angry compared with their incentive to commend the attributes when they are delighted or surprised. In addition, we find that both the subscription period and subscription experience affect consumers' review behavior, which depends on the attributes on which consumers comment. We also find that both satisfaction and emotion influence consumers' comments on various attributes. Further, we find that consumers' emotions play a moderating role in affecting how the subscription period, subscription experience, and satisfaction influence consumers' comments. These roles depend on the two critical factors—the emotion type, whether positive or negative, and the attribute types, namely, product, service, fulfillment, and value. In a new business model such as the surprise box, investigating the emotions reflected by the contents of online consumer reviews is the first step for firms to understand consumers' perceptions and evaluations of various product and service attributes. In this way, firms can better understand consumers' needs and desires, particularly in the surprise box shopping model. In addition, firms can use the positive eWOM effects generated from online consumer reviews to achieve both the cognitive and affective empathy necessary to attract future demand from consumers.

7.2. Directions of future research

This study provides several directions for future research. First, our study analyzes how consumer satisfaction level and their shopping experience affect their review behavior. Future studies could examine the antecedents of consumer satisfaction with the surprise box shopping model and the factors that drive consumers' retention in this model, thereby allowing them to accumulate more shopping experience and be with the provider for a long time. Future studies could also explore the influential factors of consumers' decisions to switch to another retailer or to add subscriptions from other retailers and the adoption or rejection of the surprise box model. Second, our study focuses on the emotional and cognitive (i.e., content) sides of online review behaviors in the surprise box model. Future studies can examine the linguistic features of online reviews such as readability, subjectivity, and diversity. In this way, the link between consumers' cognition and affection in the consumption experience and the linguistic styles of their online reviews can be explored. Third, future studies can explore how other consumers' perceptions, such as subscription intention or loyalty, are influenced when they read online reviews.

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