EXPLORING THE EFFECTS OF UNEXPECTED OUTCOME ON SATISFACTION AND CONTINUANCE INTENTION

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ABSTRACT

According to expectation disconfirmation theory, the confirmation of initial expectation is the major determinant of satisfaction, which, in turn, affects behavioral intention. However, most studies in this research stream consider only positive expected outcomes. This study separates outcomes into four types based on desirability and foreseeability. By using blogs as an example, we propose that all four types of outcomes affect satisfaction, and unexpected outcomes also generate effects on behavioral intention. Data collected from 128 physicians (bloggers) confirmed our hypotheses. Discussions and implications are provided.

Keywords: Expectation disconfirmation theory; Unexpected outcome; Blog; Physician

1. Introduction

Expectation disconfirmation theory has been widely adopted in the marketing area in order to understand repurchase intentions. Based on expectancy theory, theorists argue that each consumer possesses certain expectations before purchasing a product or service. Satisfaction is determined by confirmation, the extent to which the experience of consumption meets one's initial expectations [Oliver 1980]. Furthermore, while realized performance has a positive impact, the expectation, in general, reduces the possibility of confirmation. As an outcome, customers tend to make repurchase decisions if they are satisfied with the product or service. Recently, IS researchers also adopted this concept to understand the intention to continue using various information systems or electronic services (e.g., online banking [Bhattacherjee 2001b], online shopping [Bhattacherjee 2001a; Ha 2006; Hsu et al. 2006; Liao et al. 2009; Lu et al. 2012], online game [Liao et al. 2016], e-learning [Lee 2010], knowledge sharing [Chiu et al. 2011], Internet protocol television (IPTV) [Lin et al. 2012], strategic information systems [Lankton et al. 2014], IT outsourcing [Gorla and Somers 2014], and social networking [Hu et al. 2014]).

However, many studies have treated expectation as a unidimensional construct and examined its impact on satisfaction [Fan and Suh 2014; Lankton et al. 2014; Lee and Kwon 2011]. Although some recent studies have started to take the multi-dimensional nature of expectation into consideration [e.g. Chiu et al. 2005; Jin et al. 2010; Lankton and McKnight 2012], they have taken only the positive part of expectation into consideration. However, prior to consumption, users may expect certain negative outcomes in addition to their positive expectations. In addition, given

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that many users have limited experience of the product or service prior to their actual use or consumption of it, some experiences may be outside of their initial expectations. Customers may receive unexpected benefits from the consumption, or encounter some problems that were not expected initially. While unexpected positive experiences may enhance satisfaction and continuance intention, unexpected negative experiences may reduce satisfaction and the possibility of continuance. Failure to take these negative expectations and unexpected effects into consideration limits our understanding of the determinants of satisfaction and weakens the predicting power of expectancy theory.

For example, blogs are a popular channel for individuals to express their own opinions online [Rosenbloom 2004]. A blog is defined as "frequently modified web pages in which dated entries are listed in reverse chronological sequence" [Herring et al. 2004]. Some researchers believe blogs are interactive websites, a new form of communication that allows bloggers to publish and exchange knowledge/information [Chung et al. 2007; Rosenbloom 2004; Zhang et al. 2012]. Based on the above definitions, blogs are websites in which an individual or group logs information to be shared and interacts with others who are interested in the website. Concurrent with the growth of Web 2.0, physicians have begun adopting this channel to express their thoughts or even to communicate with their patients [Chesanow 2004; Lagu et al. 2008]. The term "physician blogs" refers to blogs owned and maintained by physicians. Physicians, in general, possess certain expectations regarding this new communication channel. While positive expectations drive them to use a blog, they may expect some potential negative outcomes as well. For example, writing articles and interacting with readers is a time consuming task. In addition, negative feedback or even criticism is not avoidable since not all readers agree with each point expressed by one blogger.

However, the actual use of a blog may also bring some unexpected outcomes. While some unexpected outcomes are positive, some may be negative. For example, bloggers may not expect some actual income generated from advertisements (which can be viewed as positive); however, bloggers may be sued for illegally revealing certain information. Dr. Robert P. Lindeman's case is one concrete empirical example. He used "Flea" as his blogger name and blogged a detailed description of a patient's death, a case which was currently involved in a malpractice lawsuit. The lawyer for the plaintiffs recognized the description of the case and sued Flea. Although this case was settled out of court, Flea suffered damages because of his blog and he eventually closed down his blog [Saltzman May 31, 2007]. Another example is the case of "Kuo, Kuan-ying" in Taiwan, a public information officer of the Taipei Economic and Cultural Office in Toronto, Ontario. He was laid off because of one article posted on his blog, under the pseudonym "Fan Lanqin" [Young 2009]. This article was considered to be insulting to his country. As an outcome, he lost his job and his pension of approximately $66,000 (USD). The above case demonstrates a fact of blogging: people who post information on their blog will most likely cause some unexpected outcomes which may be positive or negative. As a result, those unexpected outcomes may affect bloggers' attitudes and intentions toward continuing to write articles. The above highlights the need to take both expected and unexpected experiences into consideration while attempting to understand their continuance intentions regarding blogging.

Therefore, the purpose of this study is to explore the effect of those unexpected experiences, in addition to the disconfirmation of expected experiences, guided by the following research questions. RQ1: *Does the confirmation of expected negative impacts also have an effect on satisfaction?* RQ2: *Are satisfaction and continuance intention also functions of unexpected impacts?* By answering these questions, this study contributes to expectation disconfirmation theory by showing that (1) consumers may possess negative expectations before consumption, and the confirmation of negative expectations is also critical; and (2) there is a need to take unexpected effects into consideration while attempting to understand the level of satisfaction and continuance intention.

The following sections of this article are organized as follows. In the second section, we introduce expectation theory and related past studies. We then introduce the concept of unexpectedness and build corresponding hypotheses. In the third section, the research method adopted to examine proposed hypotheses is introduced. The fourth section contains the analysis results and the corresponding discussion. Lastly, we make our conclusion and lay out the implications.

2. Literature review and hypothesis development

2.1. Expectancy Theories

Two popular expectancy theories in the IS area, including Expectation Disconfirmation Theory (EDT) and Expectation Confirmation Theory (ECT), are derived from Oliver's views in the field of marketing [Oliver 1977; Oliver 1980]. In Oliver's argument, the expectation disconfirmation model expresses consumer satisfaction as a function of expectation and expectancy disconfirmation. Moreover, consumers' satisfaction is believed to influence attitude changes and repurchase intentions [Oliver 1980]. While other factors may affect repurchase intentions and customers may also decide to repurchase because no other choices exist, satisfaction is considered to be an important factor when alternative choices are available. Thus, EDT has received broad empirical examination and is a prominent

theory to explain and predict both consumers' satisfaction with a product or service and their intentions to repurchase it.

In Oliver's views, satisfaction is formed in two stages. In the pre-purchase stage, expectations for product performance are viewed as a belief in the probability of an attribute's occurrence, and those expectations form an attitude. The attitude then influences the intention to purchase, based on the theory of reasoned action [Fishbein and Ajzen 1975]. After the purchase of products or services, the initial expectations about product performance generate effects on the post-purchase evaluation. Initial expectations serve as a reference for an individual to make a comparative judgment. Expectation disconfirmation is, then, the perception of a discrepancy between expectations and post-evaluation outcomes. Confirmation takes place when product performance matches initial expectations exactly. Negative confirmation can be observed when performance is lower than initial expectations and, in contrast, positive disconfirmation refers to the condition in which performance is higher than expected. Satisfaction is a function of expectation disconfirmation. Since consumers' attitudes toward the product or service in the post-purchase stage are influenced by satisfaction, repurchase intention is, therefore, a function of satisfaction [Oliver 1980].

Swan & Trawick followed Oliver's concept to study customer satisfaction in a retail service setting [Swan and Trawick 1981]. They transferred Oliver's concept into a research framework, as shown in Figure 1. Researchers followed this framework and applied it in the areas of marketing and consumer psychology [Bolton and Drew 1991; Churchill and Surprenan 1982; Oliver 1977; Oliver 1980; Oliver 1993; Oliver and Linda 1981; Spreng et al. 1996; Tse and Wilton 1988].

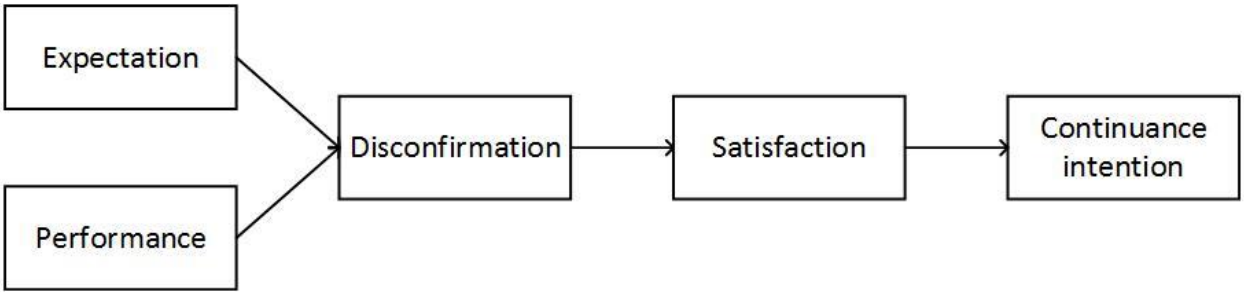

Figure 1: Expectation-Disconfirmation Model

In the IS field, Bhattacherjee adopted EDT to study the continuance intention of online banking users [Bhattacherjee 2001b] given that, in the decision making process, IS users' continuance intention is similar to consumers' repurchase decisions. They embraced the confirmation concept only, and thus developed expectation confirmation theory. That study boosted another research stream in the IS area which explores users' continuance intentions toward different information technologies and systems [Basak and Calisir 2015; Chiu et al. 2011; He and Wei 2009; Hong et al. 2006; Hsu and Lin 2015; Lee 2010; Lee and Kwon 2011; Limayem and Cheung 2008; Lin et al. 2005; Recker 2010; Thong et al. 2006]. Those studies largely ignored the role of expectation and perception and emphasized exploring other consequential outcomes of confirmation. For example, confirmation has impacts on knowledge seeking and contribution belief [He and Wei 2009], perceived ease of use [Hong et al. 2006; Thong et al. 2006], perceived usefulness [Limayem and Cheung 2008], perceived enjoyment or playfulness [Chiu et al. 2011; Lee 2010; Lin et al. 2005; Thong et al. 2006], perceived value [Hsu and Lin 2015], and familiarity and intimacy [Lee and Kwon 2011].

We include the effect of satisfaction on continuance intention in our model, even though the theory behind this relationship has been argued in both EDT and ECT [Bhattacherjee 2001b; Oliver 1980], and the relationship has been empirically confirmed [e.g. Chiu et al. 2005; Lin et al. 2005; Liu et al. 2005]. The major reason to include this relationship is that we incorporate other determinants of continuance intention in our model, and these factors may weaken the effect of satisfaction on continuance intention, the relationship is still hypothesized, even though it has been examined before.

***H1**: Satisfaction is positively associated with blog continuance intention.*

2.2. Undesirable and unanticipated outcomes

The extent to which performance meets expectation is one critical determinant of satisfaction in expectancy theories, which implies that customers are satisfied when their expectations are met. The "confirmation as a unidimensional construct" concept has been extensively adopted and empirically tested by many expectancy theories

based studies [e.g. Bhattacherjee 2001a; Bhattacherjee 2001b; Lin et al. 2005; Oliver 1977; Oliver 1980]. However, one limitation of the unidimensional concept is that the content of the expectation cannot be clearly specified. In addition, based on the discovered positive effect of confirmation/disconfirmation (on satisfaction), we may conclude that researchers believe that consumers mostly likely possess positive expectations only. Recently, in order to clearly understand the content of the expectations, some studies took a multi-dimensional concept and separated expectation into different dimensions. The proposed content of the expectations in those studies further confirmed that consumers, in general, possess positive expectations only. For example, Hsu et al. [2014] studied the confirmation of both hedonic and utilitarian types of expectation in the context of Facebook usage. Jin et al. [2010] considered the disconfirmation of both the entertainment and purposive value of bulletin board-based usage, Chen [2007] examined the confirmation of the knowledge quality and system quality of websites, McKinney et al. [2002] identified two types of disconfirmation (information quality disconfirmation and system quality disconfirmation) and their relationships with web satisfaction, and Chiu et al. [2005] considered the perception and disconfirmation of the usability, quality and value of online learning. Classifying expectations into different dimensions allows researchers to better understand the formation of satisfaction, and enables practitioners to determine how well (or which parts of) their product or service can meet customers' expectations. However, though researchers have begun to consider the multidimensional nature of expectation, past studies have largely focused on positive expectations. It is important to note that purposive actions performed by actors may contain various outcomes. Merton [1936] classified outcomes of action into *foreseeable* and *unforeseeable*, and also proposed five major reasons why some outcomes are unforeseeable to actors. First, limited knowledge or experience blocks actors from realizing the possibility that some unforeseeable outcomes may take place. Second, errors of prediction lead actors to ignore the possibility that some possible unforeseeable outcomes might take place. Third, the imperious immediacy of interest drives individuals to focus on some preferable outcomes only. Fourth, personal values or beliefs inhibit actors from considering further consequences. Fifth, any decision made or action taken changes the future, and those changes make the outcomes different from those which were predicted.

Furthermore, no matter whether those outcomes are predictable or not, they can be either desirable or undesirable. Although purposive actions performed by actors are intended to reach some desired outcomes, actors may also anticipate some undesired consequences before performing those actions. In addition, no matter whether the outcomes are desirable or not, some outcomes are unforeseeable to actors. The combination of desirability and unforeseeability generates four different results, as shown in Table 1. It is interesting to notice that the presence of unforeseeable desirable outcomes leads to a positive affect, but the absence of such outcomes does not automatically imply that a negative affect will be induced. Therefore, we specifically argue that unforeseeable desirable outcomes and unforeseeable undesirable outcomes belong to different constructs and should not be considered as different conditions of the same construct.

Table 1: Desirability and foreseeability

	Desirable	Undesirable
Foreseeable	Positive expectation	Negative expectation
Unforeseeable	Unexpected positive outcomes	Unexpected negative outcomes

In the IS area, some researchers have explored the "unintended consequences" of information technology usage [e.g. Mathieu 2007; Nworie and Haughton 2008] based on the concept proposed by Merton [Merton 1936]. The American Medical Informatics Association advocated the consideration of unintended/unanticipated consequences that could occur with the increased implementation of health information technology (HIT) [Bloomrosen et al. 2011]. However, many studies used unintended consequences to depict consequences that are not anticipated, even though the terms "unintended consequences" and "unanticipated consequences" are not synonymous [Ash et al. 2007]. For example, Link [1999] summarized some unintended consequences of information technologies, including speed (faster does not always mean better), information overload, computer and culture amplification, alienation and the demise of the community, and status division (the gap will expand between high status and low status). Other unintended consequences from other forms of information technology can also be found in the literature, such as instant messaging [Cameron and Webster 2005], email [McAulay 2007], web-based technology [Jones and Kochtanek 2002], electronic prescriptions [Palchuk et al. 2010], and computerized provider order entry systems [Ash et al. 2007; Campbell et al. 2006].

In this study, we consider unintended consequences to be a broader concept that includes both foreseeable and unforeseeable consequences. For example, while many studies focused on the unintended consequences of technology usage, such unintended consequences may be foreseeable [McAulay 2007]. We, therefore, adopted the "unforeseeable" concept in our study and specifically defined unexpected outcomes as "consequences of blogging

that are unforeseen by bloggers." In addition, since unforeseen consequences are not necessary undesirable [Merton 1936], we further classified them into two types: positive and negative.

The positive expectation refers to those foreseeable and desirable outcomes or experiences that can be obtained through consumption. This type of outcome is well recognized to have a positive impact on satisfaction and has been explored extensively by past expectancy-based studies [e.g. Bhattacherjee 2001a; Bhattacherjee 2001b; 2005; Oliver 1977; Oliver 1980]. Satisfaction is formed by a *contrast effect* that means one relies on the extent to which performance meet expectation to form satisfaction judgments [Lankton and McKnight 2012]. Given the significant results of related empirical studies, a positive relationship between positive confirmation and satisfaction can, therefore, be assumed. Therefore, a positive relationship is hypothesized.

***H2a**: Confirmation of positive expectations is positively associated with satisfaction.*

The second type of outcome is "foreseeable but not desirable." It is very likely that rational actors can foresee some undesirable outcomes that may possibly be caused by performing a behavior. We regard this type of foreseeable, undesirable outcomes as a negative expectation. Since those outcomes are not desirable, the actual occurrence of those outcomes can be considered as low performance (as indicated by Oliver [1977; 1980]) which, therefore, is believed to have a negative effect on satisfaction. For example, bloggers may expect that some negative feedback from readers is unavoidable. This negative feedback may cause cognitive disturbance or lead to a negative mood. Reasonably, even though those negative outcomes are expected, bloggers tend to be less satisfied when they do take place because negative outcomes are considered unwanted and lead to negative emotions. Therefore, a negative relationship between the confirmation of negative expectations and satisfaction is hypothesized.

***H2b**: Confirmation of negative expectations is negatively associated with satisfaction.*

However, as indicated by Merton [1936], it is not rare that purposive actors (such as consumers or users) are not able to perfectly predict the future since they have limited experience with the product or service, mistakenly predict the outcomes of their action, focus on some outcomes only, and/or are constrained by their value system. The likelihood is then high that some outcomes of purchasing/using the product or service may be unanticipated or outside of their initial expectations. In this study, we also take those unforeseeable outcomes into consideration and explore their impacts on satisfaction and continuance decision. Specifically, the term "unexpected outcomes" is adopted to be contrasted with the construct "outcome expectation." In addition, based on the desirability of the outcomes, we further consider that those unforeseeable outcomes may be positive or negative.

We view the failure to incorporate the effect of unexpected positive and negative outcomes as one significant limitation of traditional expectancy theories based research. In fact, the relationship between unexpected outcomes and emotional decision outcomes (such as satisfaction) has been studied since the 1960s. Early studies found that the more unexpected the success, the more satisfied were the subjects [Verinis et al. 1968]. Furthermore, Feather [1969] used the valence difficulty model for predicting the attractiveness of success and the repulsiveness of failure. The results showed that subjects who experienced unexpected success rated themselves as more satisfied than did those who expected success. Later, House and Perney [1974] also tested with the valence difficulty model and found unexpected success to be more satisfying than expected success. More recently, Shepperd and McNulty [2002] again studied how people feel about unexpected outcomes. The results showed that a positive outcome does make actors feel good. Oliver et al. [1997] also pointed out that a surprisingly positive performance of a service or product does enhance satisfaction through promoting a positive effect. Since the above studies all indicate that unexpected positive outcomes should be positively associated with satisfaction, we, therefore, hypothesize the following.

***H3a**: An unexpected positive outcome is positively associated with satisfaction.*

On the other hand, we also hypothesize that unexpected negative outcomes should be negatively associated with satisfaction. Shepperd and McNulty [2002] found that a negative outcome does induce negative feelings in actors whenever such an outcome is expected. However, since people are mentally unprepared for unexpected failure, they tend to feel more uncomfortable or shocked by such failures. Therefore, the more unexpected the failure, the less satisfied the subjects [Verinis et al. 1968]. Based on the valence difficulty model, House and Perney [1974] also found that unexpected failure leads to low satisfaction because individuals tend to feel less satisfied when experiencing unexpected failure than when experiencing expected failure. We, therefore, hypothesize the following.

***H3b**: An unexpected negative outcome is negatively associated with satisfaction.*

In this study, we also attempt to build the relationship between unexpected outcomes and continuance intention. According to expectancy theories, confirmation/disconfirmation of expectation generates effects on continuance intention by affecting satisfaction. Given that those outcomes are expected, one can reasonably believe that the affective outcome (satisfaction) precedes continuance intention. However, unexpected outcomes are unforeseeable to the actor. The actual occurrence of those outcomes not only causes psychological shock (which then affects satisfaction) but also alters one's attitude toward the behavior. Behavior is a functioning attitude, and attitude is determined by the belief regarding the benefit and cost of performing that behavior [Fishbein and Ajzen 1975]. Unexpected positive outcomes bring benefits to actors. Those outcomes serve as evidence which drives individuals to believe that continuing to perform that behavior is worthwhile. The positive attitude toward the behavior is then increased. Given that past studies have found that attitude is the most critical determinant of behavior, we propose that unexpected outcomes also have an effect on continuance intention [Bhattacherjee and Premkumar 2004; Glasman and Albarracín 2006; Pavlou and Fygenson 2006; Wixom and Todd 2005]. Thus, we hypothesize a positive relationship between unexpected positive outcomes and continuance intention.

***H4a**: An unexpected positive outcome is positively associated with blog continuance intention.*

On the other hand, unexpected negative outcomes can be viewed as extra costs not expected initially. Those outcomes drive actors to believe that the cost of performing that behavior is unexpectedly high. As an outcome, the positive attitude toward performing the behavior (in the future) is then decreased. Specifically, while unexpected positive outcomes may drive individuals to keep performing the same behavior, unexpected negative outcomes block one from continuously performing that behavior. Hence, we hypothesize the following.

***H4b**: An unexpected negative outcome is negatively associated with blog continuance intention.*

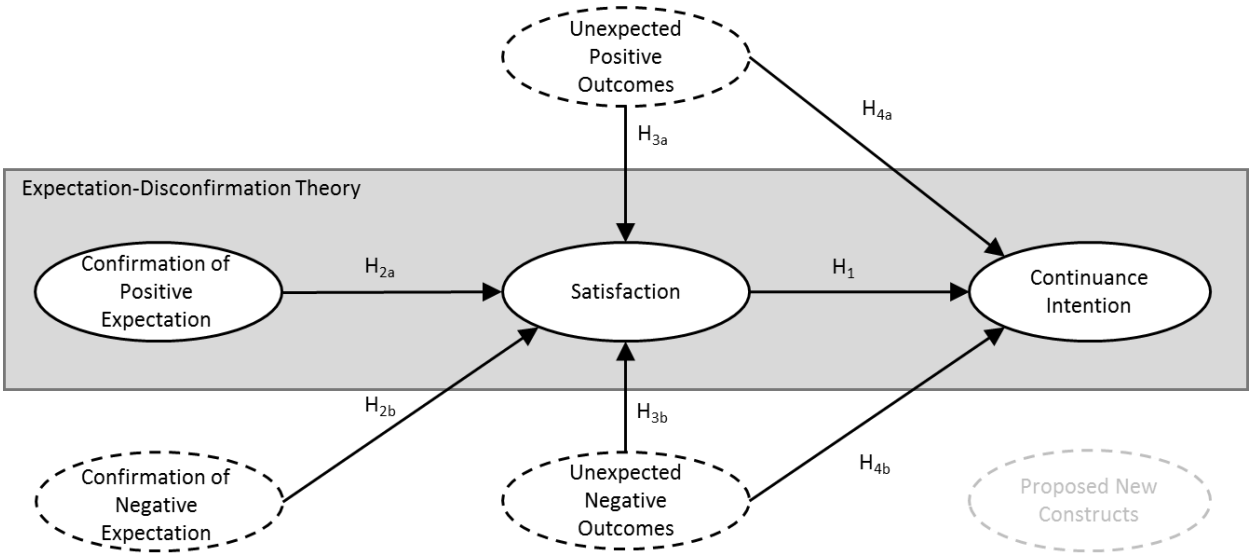

Figure 2: Research Model

3. Research method

3.1. Data collection

Based on the purpose of this study and the proposed model, subjective-report survey data was used to test the proposed hypotheses. Physicians who have created a blog are the research subjects in this study. A blog was chosen rather than other social networking tools, such as Facebook, because articles published in a blog are easier to lay out by themes or according to the writers' own arrangement, a function Facebook lacks. Thus, blogs that focus on a specific theme (such as healthcare) are still popular among professionals. In addition, blogs allow writers to convey complete ideas and to interact with their audience. Therefore, blogging is still popular in Taiwan, especially for professional

writers, such as travelers, food critics, and physicians. Physician bloggers were selected because they are easier to identify and their blogs are diversified with different purposes such as knowledge/information sharing, commercial marketing, online diary, creation publishing, communication, and education. In Taiwan, there are many blog service providers such as Wretch, Yahoo, Pixnet, Yam, udn, Google blogger, and so on. In addition to the general blog platforms, some platforms were specifically designed for doctors and other medical professionals, e.g., Kingnet (National Network Hospital). In order to identify bloggers who are doctors, we used the keyword "doctor" in the search engine provided by each blog platform (mentioned above). After filtering out veterinarians, pseudo-doctors, and non-identifiable doctors, we identified 877 blogs owned by physicians.

We delivered the questionnaire to the physician bloggers in two ways. First, we contacted physicians via email, if such information could be found on their blogs. Second, we left an invitation message (to participate in the survey) on doctors' blogs when corresponding contact information could not be identified. The message introduced our research purpose and provided a link to our online questionnaire. In order to increase the response rate, we also provided an incentive gift (a special design USB thumb drive) to each respondent who submitted a valid questionnaire. A total of 128 physicians filled the survey. This sample size is considered acceptable, based on the "5 times the number of indicators" rule of thumb for structural equation modeling [Hair et al. 2010]. Table 2 shows the demographic information of all 128 respondents. The representativeness of our sample can be partially ensured given that its composition is very similar to the population (e.g., gender and license type).

Table 2: Demographic information

Items	#	%	Specialty	#	%
Gender			Anesthesiology	1	0.8 %
Male	105	82.0 %	Cardiovascular Medicine	2	1.6 %
Female	23	18.0 %	Cardiovascular Surgery	1	0.8 %
			Chest Medicine	1	0.8 %
Age			Dermatology	10	7.8 %
Under 30	13	10.2 %	E.N.T.	10	7.8 %
30-39	59	46.1 %	Emergency Medicine	4	3.1 %
40-49	38	29.6 %	Family Medicine	12	9.4 %
50 and above	18	15.1 %	Gastrointestinal Medicine	1	0.8 %
			General Medicine	5	3.9 %
Career Level			Geriatrics	1	0.8 %
Visiting Staff	99	77.3 %	Infection	1	0.8 %
Fellow	2	1.6 %	Nephrology	1	0.8 %
Chief Resident	8	6.3 %	Neurology	2	1.6 %
Resident	19	14.8 %	Neurology Surgery	2	1.6 %
			Nuclear Medicine	1	0.8 %
Practice Institution			Obstetrics and Gynecology	11	8.6 %
Medical center	52	40.6 %	Ophthalmology	6	4.7 %
Regional hospital	27	21.1 %	Orthopedics	3	2.3 %
District hospital	11	8.6 %	Pediatrics Medicine	8	6.3 %
Clinics	43	33.6 %	Plastic Surgery	3	2.3 %
			Psychiatry	2	1.6 %
License			Radiology Diagnostic	2	1.6 %
West Medicine	104	81.3 %	Rehabilitation	2	1.6 %
Chinese Medicine	19	14.8 %	Surgery	10	7.8 %
Dentist	5	3.9 %	Urology	1	0.8 %

3.2. Constructs and measurements

Except for those items measuring unexpected positive and negative outcomes, all measurement items used constructs derived from prior research. Since items adapted from past studies were in English originally, we translated them into traditional Chinese first and then made minor modifications in order to fit them into our research context. On the other hand, for unexpected outcomes, we developed those items based on the unforeseeable nature proposed by Merton [1936]. To assure the face validity of the questionnaire, the questionnaire was examined by two scholars in the IS field and one scholar in the field of Chinese literature. In addition, in order to ensure that our translation did not distort the real meaning for those adapted items, a Chinese-to-English back-translation was performed by one

scholar who was not familiar with the research content. Since no significant differences were found, we are confident regarding the quality of the adapted items. For all items, we then invited two physician bloggers to pre-test our questionnaire. Slight modifications were then made based on the feedback.

In this study, six constructs were proposed, including disconfirmation of positive expectation, disconfirmation of negative expectation, unexpected positive outcome, unexpected negative outcome, satisfaction, and blogging continuance intention. All items were scored on a 5-point Likert scale, anchored from 1 (strongly disagree) to 5 (strongly agree). We developed multi-item scales to measure each construct of this study. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy is 0.786. The minimum required value of KMO is 0.50, and the value between 0.7 and 0.8 is considered as middling [Kim and Mueller 1978]. In addition, the Bartlett's test of sphericity was significant ($p<0.001$). The results show that conducting factor analysis is adequate for our data.

Confirmation of positive (negative) expectations refers to the extent to which subjects' pre-usage desirable (or undesirable) expectations of blog usage are met during actual usage experience [Bhattacherjee and Premkumar 2004]. A total of 9 items adapted from Bhattacherjee & Premkumar [2004] were used to capture these constructs. *Satisfaction* refers to the bloggers' affectations toward (feelings about) prior blog use; a total of 4 items adopted from Bharttacherjee [2001b] were used to capture the level of satisfaction. *Continuance intention* refers to bloggers' intentions to continue using a blog. A total of 3 items adapted from Bhattacherjee [2004] were used to capture the possibility that respondents will keep blogging in the near future. *Unexpected* outcomes refer to the consequences of post-blogging being unforeseen or unpredictable by the blogger. The consequences could be positive or negative. A total of 5 items (3 for positive and 2 for negative outcomes) were used to capture the extent to which respondents encountered some unexpected outcomes.

The *reliability and validity* of the used items were examined by using Partial Least Squares (PLS). PLS is a component-based structural equation modeling (SEM) method which can be used for theory building. Given that the measurements of some constructs (e.g., unexpected outcomes) are self-developed and the goal of this study is to extend existing theory, PLS is, therefore, suitable for construct validation and hypothesis testing. We first tested item reliability, convergent validity and discriminant validity [Hulland 1999]. Individual item reliability can be examined by observing the factor loading of each item. As shown in Table 3, all factor loadings are significant, using t-statistics, with most being higher than the recommended 0.7, except for 2 indicators in negative disconfirmation [Hulland 1999]. This item remained in the following analysis since it was not lower than the minimum cut-off value (0.5). The item-total correlations (ITC) are also higher than the recommended cut-off value of 0.3. Therefore, individual item reliability is ensured in this study. Convergent validity should also be examined because more than two indicators were used to measure each construct. We used the composite reliability (CR) of constructs and average variance extracted (AVE) by constructs to evaluate convergent validity [Fornell and Larcker 1981]. Convergent validity is ensured since the composite reliability of all constructs is higher than 0.7, and the AVE values are all greater than 0.5. Finally, to ensure discriminant validity, correlations between paired variables should be lower than 0.9, items should have high loading values for the intended construct and low loading values for other constructs and the square root of AVE should be higher than the correlation coefficients. As shown in Table 4 and the Appendix, the correlations between pairs of constructs are below 0.6, there is no cross-loading problem, and the square root of AVE is higher than each corresponding correlation coefficient [Chin 1998]. These properties indicate that the construct measures are sufficiently distinct from each other. Therefore, we concluded that the quality of our measurements is acceptable.

Table 3: Validity and reliability

Constructs	Items	Loadings	ITC
Confirmation of positive expectations Alpha:0.92; AVE:0.71; CR:0.94	Since I started blogging, the improvement of my reputation has been (much worse than expected…much better than expected)	0.84	0.79
	Since I provided medical knowledge on my blog, the promotion of my professional image was (much worse than expected…much better than expected)	0.87	0.85
	Since I provided medical knowledge on my blog, the increase of patients visiting my clinics has been (much worse than expected…much better than expected)	0.83	0.78
	Since I provided medical knowledge or practice experiences on my blog, the performance that general public receives the correct medical information has been (much worse than expected…much better than expected)	0.74	0.74
	Since I started blogging, the improvement of communication between patients and myself has been (much worse than expected…much better than expected)	0.78	0.74
	Since I started blogging, the enhancement of relationships between patients and myself has been (much worse than expected…much better than expected)	0.82	0.79
Confirmation of negative expectations Alpha:0.81; AVE: 0.72; CR:0.89	Since I started blogging, the negative consequence has been (much better than expected…much worse than expected)	0.61	0.71
	Since I started blogging, the harmful consequences (such as legal issues or external censure) were (much better than expected…much worse than expected)	0.97	0.72
	Since I started blogging, the level to which my interpersonal relationships have been jeopardized has been (much better than expected…much worse than expected)	0.67	0.55
Satisfaction Alpha:0.89; AVE:0.76; CR:0.93	Overall experience of blog use: Very dissatisfied/Very satisfied	0.88	0.75
	Overall experience of blog use: Very displeased/Very pleased	0.92	0.85
	Overall experience of blog use: Very frustrated/Very contented	0.90	0.83
	Overall experience of blog use: Absolutely terrible/Absolutely delighted	0.86	0.77
Unexpected positive outcome Alpha:0.83; AVE:0.73; CR:0.89	Since I started blogging, there were a lot of unexpected positive outcomes happened to me	0.81	0.65
	I encountered a lot of unexpected positive consequences because of my blogs	0.92	0.79
	I faced unexpected positive consequences because of my blogs	0.88	0.68
Unexpected negative outcome Alpha:0.89; AVE:0.90; CR:0.94	I encountered a lot of unexpected negative consequences because of my blogs	0.95	0.73
	I faced unexpected negative consequences because of my blogs	0.91	0.73
Continuance intention *Alpha:0.94*; *AVE:0.90*; *CR:0.96*	I plan to continue blogging or updating my blog frequently	0.93	0.84
	I intend to continue blogging to achieve my expectations of blogs	0.95	0.89
	I will continue blogging even though I am busy	0.90	0.79
ITC: Item-Total Correlation			

Table 4: Intercorrelations of the latent variables

Constructs	Mean	Std. dev.	M3	M4	Correlation Matrix					
					PD	ND	Sat	UP	UN	CI
Positive disconfirmation	2.88	0.88	0.07	0.06	**0.85**					
Negative disconfirmation	2.94	0.52	0.09	5.91.	0.08	**0.85**				
Satisfaction	3.49	0.70	0.39	-0.08	0.46	-0.14	**0.87**			
Unexpected positive	3.18	0.75	0.16	-0.07	0.51	0.16	0.54	**0.85**		
Unexpected negative	2.28	0.75	0.20	0.13	-0.04	0.09	-0.14	0.04	**0.95**	
Continuance intention	3.88	0.76	-0.68	1.08	0.30	0.01	0.50	0.45	-0.27	**0.95**
M3: Skewness; M4: Kurtosis; Square root of the AVE on the diagonal of correlation matrix										

Since the data collected in this study are self-reported by each respondent, common method variance (CMV) could be a problem. Harman's single factor test [Podsakoff et al. 2003] was adopted to examine CMV's influence. According to the results of EFA with an un-rotated method, 6 factors were extracted and the general factor variance was 32.42%. In addition, as suggested by Pavlou et al. [2006], inter-construct correlations with values higher than 0.9 could raise suspicions of CMV. In our study, the correlations ranged from 0.01 to 0.54; none of the inter-construct correlations exceeded the threshold. The results showed that CMV is unlikely to have a major influence on the data.

3.3. Data analysis and discussion

We used SmartPLS 2.0 M3 to test the structural model. The structure model analysis test contains two steps. First, the estimation of parameters in the inner and outer model was accomplished by PLS path modeling. Second, the significance of path coefficients was examined using a bootstrapping technique with random resampling 500 times.

Figure 3 shows the results of the structural model test. The R^2 for blog continuance intention is 0.356 and is 0.323 for satisfaction. We adopted a recently-proposed global goodness of fit (GOF) to examine the overall model fit [Tenenhaus et al. 2005]. Wetzel et al. [2009] also pointed out the baseline criteria for small, medium, and large effect sizes (GOF small=0.1, GOF medium=0.25, and GOF large=0.36) for validating the PLS model globally. We calculated the GOF index of this research model and the result was 0.53 which exceeds 0.36 (the cut-off value of the GOF large effect). This, therefore, indicated that our model was valid.

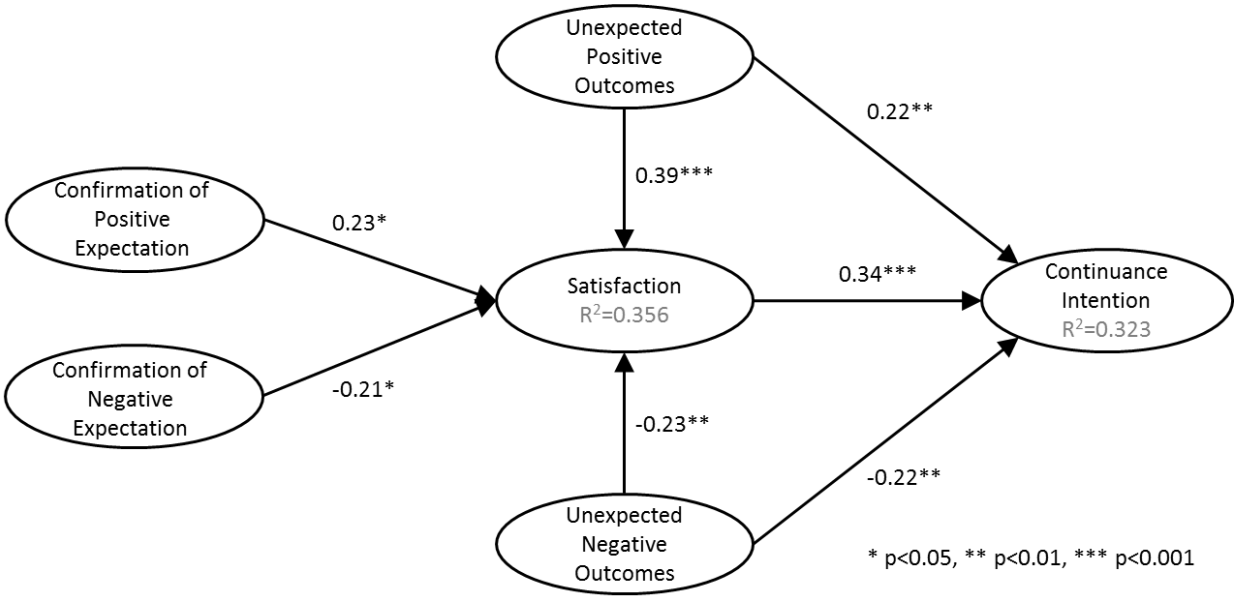

Figure 3: Analysis result

As we can see in Figure 3, the disconfirmation of positive expectations (β=0.23, $p < 0.05$) and the encountering of unexpected positive outcomes (β=0.39, $p < 0.001$) both affect satisfaction positively. The disconfirmation of negative expectations (β=-0.21, $p < 0.05$) and the encountering of unexpected negative outcomes (β=-0.23, $p < 0.05$) both affect satisfaction negatively. These four factors, in total, explain 35.6 percent of satisfaction. In addition, aligning with expectation disconfirmation theory, satisfaction can predict continuance intention significantly (β=0.34, $p <$

0.001). Lastly, unexpected positive (β=0.22, $p < 0.01$) and negative (β=-0.22, $p < 0.01$) outcomes also influence continuance intention. Satisfaction and unexpected outcomes, together, explain 32.3% of the variance of continuance intention. Since the paths are all significant at 0.05 or 0.001 levels, all proposed hypotheses are supported.

Given that we intend to first include the confirmation of negative expectations and then include unexpected outcomes in traditional expectancy theory-based models, we need to compare the fit of several different versions of the model. We first show the fit of the original model (Model 1). We then show the fit after including the confirmation of negative expectations (Model 2) and show the fit again after including unexpected outcomes (Model 3). Table 5 shows the comparison of these three models as demonstrated by two model fit indexes: GOF and R^2. The GOF value increases slightly after including the confirmation of negative expectations (from 0.42 to 0.43)and increases significantly after including the unexpected outcomes (from 0.43 to 0.52). This implies that adding unexpected outcomes does increase the explanatory power of the model. For R^2, adding the confirmation of negative expectation raises the R^2 of satisfaction from 0.205 to 0.237 (which is significant at the $p < 0.05$ level), and adding the unexpected positive and negative outcomes further raises the R^2 of satisfaction from 0.237 to 0.356 (which is significant at the $p < 0.001$ level). For continuance intention, adding the confirmation of negative expectation raises the R^2 from 0.259 to 0.260 (which is insignificant because there is no new construct link to continuance intention) and adding the unexpected positive and negative outcomes raises the R^2 of continuance intention from 0.260 to 0.323 (which is significant at the $p < 0.01$ level). This evidence aligns with our intention and shows that adding the confirmation of negative expectation and unexpected outcomes is meaningful and critical.

Table 5: Model fit indexes

	Model (1)	Model (2)	Model (3)
GOF	0.42	0.43	0.52
R^2 (Satisfaction)	0.205	0.237	0.356
ΔR^2 (Satisfaction)	--	0.032*	0.119***
R^2 (continuance intention)	0.259	0.260	0.323
ΔR^2 (continuance intention)	--	0.001	0.063**
Note: * p<0.05; ** p<0.01, *** p<0.001			

Aligning with expectancy theory-based studies, confirmation of positive expectations has a positive impact on satisfaction, and satisfaction positively affects continuance intention. However, as we indicated at the beginning, most expectancy theory-based studies consider confirmation of expectation as the most influential—if not the only—antecedent of satisfaction [e.g. Bhattacherjee 2001b]. In this study, we successfully demonstrate that when expectations regarding negative outcomes and unexpected outcomes are taken into consideration, the dominant role of confirmation of positive expectations is altered. Interestingly, among those four antecedents of satisfaction in our model, the unexpected positive outcome has the highest coefficient. This implies that satisfaction is more strongly determined by unexpected positive outcomes. On the other hand, the confirmations of positive expectations, negative expectations, and unexpected negative outcomes all have moderate-level effects (compared with unexpected outcomes). For continuance intention, satisfaction has the strongest predicting power, followed by unexpected positive outcomes and unexpected negative outcomes. Furthermore, past studies aiming at comparing the effects of expected and unexpected outcomes have shown that unexpected outcomes generate a greater effect [e.g. Shepperd and McNulty 2002]. Aligning with these studies, our results also show that unexpected outcomes (β=0.39) do generate a greater effect than do expected positive outcomes (β=0.23). However, even though the coefficient of unexpected negative outcomes (β=0.23) is slightly higher than that of expected negative outcomes (β=0.21), their effects are similar. It is interesting that physicians rate unexpected positive outcomes higher than expected outcomes. This indicates that physicians encounter many unexpected positive outcomes and that these outcomes have critical implications which lead to a significantly positive affect. On the other hand, it is also interesting that the score of unexpected negative outcomes is not high (mean=2.18). It is possible that the unexpected outcomes encountered by physicians are not critical (i.e., the kind which may cause severe damage), so physicians are not strongly affected.

4. Conclusion

This study addresses the issue of outcome foreseeability and desirability. Drawing on the limitations of past expectation disconfirmation studies, in which expectation is unidimensional or only positive expectations are taken into consideration, we hypothesized that satisfaction is a function of the disconfirmations of both positive and negative expectations. In addition, we also took unexpected outcomes into consideration and proposed their impacts on satisfaction and continuance intention. Data collected from 128 physicians, who are also bloggers, shows that while

the disconfirmations of both positive and negative expectations have effects on satisfaction, unexpected positive outcomes have an even stronger impact and unexpected negative outcomes have a moderately negative effect on satisfaction. In addition, while the effect of satisfaction is controlled, continuance intention is also a function of both types of unexpected outcomes. Both our research questions have been answered. This study helps shed light on the EDT research area by showing the effects of negative expectations and unexpected outcomes. The results offer interesting implications for both academic researchers and practitioners.

However, any researchers attempting to apply our research results should also pay attention to the following limitations of this study. First, this is a cross-sectional study and focuses on physician only. Each respondent is asked to provide information for all variables. Even though the test result shows that common method variance is not a critical issue in our study, future researchers are encouraged to take the other behaviors into consideration and use objective data for some variables to eliminate possible common method bias. Since the majority of physicians are male in Taiwan, future studies may examine whether gender may play a role. In addition, the majority of our sample is 30 to 39 years old, due to the long education and training process. However, the major users group of many newly developed technologies are young generation under 30. It is therefore also critical to ensure the external validity by increasing the variety of samples. Second, in order to maintain the parsimony of our research model, we did not separate expectations or outcomes into different dimensions. Since expectations and unexpected outcomes might be multi-dimensional, future researchers are encouraged to investigate the effects of different dimensions of expected and unexpected outcomes. Third, we did not investigate the conditions in which consumers possess negative expectations but receive positive outcomes, or possess positive expectations but received negative outcomes. We also did not attempt to compare the costs and benefits of negative outcomes [Golub et al. 2009]. Researchers are encouraged to further explore the above issues to expand our understanding in this area. Fourth, some factors, such as self-efficacy, may play a role in the model. For example, the impact of negative outcomes (both expected and unexpected ones) is weaker when self-efficacy is high. Future research is encouraged to take those factors into consideration to extend the current model. Lastly, while blogging is still a popular way for many professionals to communicate their thoughts and ideas with readers or friends, the recent rapid development of social networking sites suggests a need to verify our results across new media to increase generalizability.

4.1. Implications for academia

For implications for academia, first, in addition to the disconfirmation of positive expectations, disconfirmation of negative expectations was also found to be significant. This result indicates that consumers possess both positive and negative expectations before adoption, and satisfaction is affected by the confirmation of both types of expectation. This implies that future research should not ignore the possibility that users or consumers may have negative expectations regarding a product or service. We can conclude that treating expectation as an unidimensional construct is not wise; nor should researchers focus exclusively on the positive features of a product or service (e.g., Jin et al. [2010]; Chiu et al. Chiu et al. [2005]; Chen [2007] and McKinney & Yoon[2002]). Furthermore, our research context is post-adoption, which means consumers still decide to use a blog even though some negative outcomes are expected. However, the level of satisfaction is significantly lower when those expected negative outcomes are found. Some may argue that since negative outcomes are expected, the confirmation of those negative expectations may not significantly lower the level of satisfaction. However, our result shows that the confirmation of negative expectations does reduce the level of satisfaction. This indicates that even if negative outcomes are expected initially, the level of satisfaction is lower when those negative expectations are actually fulfilled.

Second, in addition to expected outcomes, unexpected outcomes also generate certain effects. Among the four proposed antecedents, the experience of unexpected positive outcomes has a relatively strong effect on satisfaction. The high coefficient we observed indicates that satisfaction is more decisively determined by unexpected positive outcomes. This is reasonable, considering that consumers are surprised since those outcomes are not expected. Since unexpected outcomes can be viewed as a form of arousal, and positive outcomes lead to delight (a temporary and extremely positive feeling [Oliver et al. 1997]), and delight is a higher level of affect, we are not surprised that the level of satisfaction is high as well. In contrast, the effects of positive expectations, negative expectations, and unexpected negative outcomes are not as strong as positive unexpected outcomes. The comparison between unexpected positive and negative outcomes demonstrates that the emotion of consumers is more affected by positive instances. This result answers our research question, indicating that unexpected outcomes are critical as well. This also implies that future continuance intention studies should not exclude the impact of unexpected outcomes.

Third, both unexpected positive and negative outcomes affect continuance intention significantly. The magnitudes of the impacts of these two types are similar while, as anticipated, their directions are opposing. This indicates that physicians are more likely to continue blogging after finding that blogging can bring some unexpected positive outcomes. Positive unexpected outcomes promote continuance intention both directly and indirectly by increasing the level of satisfaction. The indirect effect implies that unexpected positive outcomes arouse a positive affect, and the

positive affect drives individuals to believe that performing the behavior is worthwhile. On the other hand, from a motivation-behavior perspective, the direct effect implies that physicians are encouraged by those unexpected outcomes extrinsically and tend to continue their current behavior to pursue those unexpected extrinsic rewards. This highlights a need to investigate the unexpected rewards in order to expand the motivation-behavior research stream. However, this also raises another question: what will physicians do if the unexpected outcome top occurring or decrease in frequency? Future researchers are encouraged to continuously explore this issue with the longitudinal approach in order to answer this question explicitly.

Unexpected negative outcomes were found to affect continuance directly and indirectly by reducing the level of satisfaction. Consumers start blogging to express their opinions, communicate with consumers, or even simply to relieve their stress by this means. However, the behaviors of audiences or online readers are not predictable. Some may embrace and some may argue against the content expressed by physicians. Readers may react to the content negatively, and that unexpected negative feedback may be troublesome. In addition, since physicians are medical but not legal professionals, they may suffer from unexpected legal issues. Physicians stop blogging after such unexpected negative outcomes cause them significant legal problems. However, note that we did not investigate the absolute difference between positive and negative unexpected outcomes. An interesting question to pursue is whether continuance intention is also a function of the absolute difference between positive and negative outcomes. Further researchers are encouraged to further reveal the absolute and relative effects generated by those two types of outcomes.

4.2. Implications for practitioners

According to expectancy theories, it is important for service providers or product manufacturers to understand customers' expectations. As an outcome, providers or manufactures can try to meet or exceed customers' expectations in order to increase the level of satisfaction and boost continuance or repurchase intentions. Our results show that positive and unexpected outcomes have a greater impact than do negative or expected outcomes. Therefore, bloggers may wish to pay more attention to offering services which can meet customers' positive expectations, as well as help customers to achieve positive outcomes which they may not have expected initially. Since the effect of an unexpected outcome is stronger than that of an expected outcome, service providers must be able to identify events that result in unexpected positive outcomes and unexpected negative outcomes. Note, however, that as an unexpected outcome becomes predictable, bloggers will eventually no longer be surprised, turning what was once unexpected into an expected outcome for new bloggers coming onboard. Therefore, we recommend that service providers keep a close watch to determine which events will make bloggers pleasantly surprised, and try to make them happen. Conversely, service providers will also want to prevent unexpected negative outcomes from occurring to bloggers. Since our results show that the confirmation of negative expectations actually reduces bloggers' satisfaction, there is a need for webmasters to understand the potential negative expectations of their users and try to help customers to avoid the realization of those negative expectations.

Unexpected outcomes do affect satisfaction, especially unexpected positive outcomes. Unexpected outcomes also affect continuance intention directly and indirectly through satisfaction. This implies that webmasters should provide certain features that can help bloggers to receive unexpected positive outcomes. This again highlights how important it is for webmasters to understand their customers' expected outcomes so that webmasters can know what features may not match customers' expectations.

However, it is noticeable that the interactive nature of Web 2.0 tools (such as blogging) implies that many unexpected outcomes can come from interactions between bloggers and readers. In addition to providing features to facilitate the achievement of unexpected positive outcomes, webmasters should also help avoid possible negative outcomes generated by interactions between different users. For example, automatically screening out some inappropriately sensitive content may help avoid potential legal problems for bloggers. This implies that, in addition to offering features to facilitate interactions among users, webmasters should pay attention to policy-making as well. With effective policies, some negative outcomes may be avoided. However, since those negative impacts are unforeseeable and customers only realize those outcomes after receiving them, more attention may be paid to the recovery process.

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Appendix

Cross loading table						
	Confirmation of positive outcomes	Confirmation of negative outcomes	Unexpected positive outcomes	Unexpected negative outcomes	Satisfaction	Continuance intention
CP1	**0.84**	0.06	0.43	0.51	-0.12	0.32
CP2	**0.87**	0.05	0.43	0.41	-0.07	0.35
CP3	**0.83**	0.04	0.32	0.29	-0.09	0.28
CP4	**0.74**	-0.07	0.31	0.34	-0.07	0.28
CP5	**0.78**	-0.06	0.35	0.29	0.04	0.13
CP6	**0.82**	-0.04	0.33	0.32	0.04	0.11
CN1	0.12	**0.61**	0.00	0.08	0.03	-0.02
CN2	-0.05	**0.97**	-0.20	-0.06	-0.06	-0.11
CN3	0.16	**0.67**	-0.06	0.05	-0.03	0.08
UP1	0.42	-0.23	**0.88**	0.51	-0.26	0.55
UP2	0.35	-0.19	**0.92**	0.50	-0.12	0.47
UP3	0.45	-0.13	**0.90**	0.49	-0.08	0.35
UN1	0.39	-0.07	**0.86**	0.44	-0.03	0.43
UN2	0.41	-0.10	0.42	**0.81**	0.12	0.28
SAT1	0.46	0.00	0.50	**0.92**	-0.15	0.46
SAT2	0.32	-0.01	0.51	**0.88**	0.01	0.46
SAT3	-0.04	-0.02	-0.15	-0.05	**0.95**	-0.28
SAT4	-0.07	-0.09	-0.12	0.01	**0.91**	-0.22
CI1	0.28	-0.07	0.46	0.43	-0.24	**0.93**
CI2	0.33	-0.01	0.50	0.46	-0.26	**0.95**
CI3	0.24	-0.11	0.46	0.42	-0.26	**0.90**