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Toward E-Commerce Website Evaluation and Use: Qualitative and Quantitative Understandings

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ABSTRACT

Users' affective evaluation of websites upon mere exposure hasn't been studied extensively despite its essential influence on attitude and use decision. Based on psychological and information systems (IS) literature, this paper investigates three affect-related concepts and their effects: affective cues, perception of positive affective quality (PPAQ), and perception of negative affective quality (PNAQ). We propose a causal model to describe how affective cues of an e-commerce website induce PPAQ and PNAQ, which in turn impact user attitude toward using this website and intention to use it. The model is tested in two studies, face-to-face interviews and an online survey. This paper adds value to the literature by providing both qualitative and quantitative understandings of the antecedents and impacts of exposure-based affective evaluations in hedonic and utilitarian use of e-commerce websites.

Keywords

E-commerce website evaluation, affective cues, perception of positive affective quality (PPAQ), perception of negative affective quality (PNAQ), attitude toward behavior, behavioral intention.

INTRODUCTION

Many studies have examined the impacts of users' *cognitive evaluations* of websites on attitude and behavior. Fewer studies investigated the influences of users' *affective evaluations*, especially affective evaluations based on mere exposure to e-commerce websites, though they may easily drive users away or attract them to use a website in a short period of time.

A user's interaction with an e-commerce website involves at least two stages: the website is exposed to a user, and the user continues to use it by exploring and acting upon it (e.g., clicking on links, reading texts, checking out, etc). Design features of e-commerce websites can quickly elicit preliminary or immediate affective evaluations during the exposure stage. This type of evaluations are toward the websites, or, object-based. The preliminary affective evaluations can significantly influence one's cognitive and other affective evaluations of the website during the exploration stage. The exploration-stage-evaluations are toward the behavior of using websites, or, behavior-based.

The preliminary affective evaluations along with other evaluations can impact one's attitude toward, intention to and actual behavior of using the websites. Therefore, it is essential to investigate the antecedents and influences of the preliminary exposure-based affective evaluations in e-commerce website usage.

An extensive literature review on affective concepts related with e-commerce websites found that only several affective concepts, emotion (Kim and Moon 1998), aesthetic attraction (Sutcliffe 2002), perceived affective quality (Zhang and Li, 2005, Zhang and Li, 2004), perception of an IT's capability to induce positive affect and perception of the IT's capability to induce negative affect (Zhang and Li, 2007), are object-based affective reactions that are formed based on exposures to websites without further interactions. Most studied affective concepts occur during the exploration/use stage of user-website interaction, thus behavior-based. Only a few studies investigated website design features as antecedents of users' affective evaluations (Agarwal and Venkatesh, 2002, Kim and Moon, 1998, Kim et al., 2003).

In this study, we build on psychological literature and the previous IS studies to examine the antecedents and impacts of users' mere exposure-based affective evaluations in the e-commerce website use setting.

THEORETICAL DEVELOPMENT

Website Affective Cues

Certain features of a stimulus in one's environment have the ability to change this person's affect or mood. Mehrabian and Russell name this kind of features the affective quality of a stimulus (Mehrabian and Russell, 1974). For example, the orange color on a classroom's wall may change a student's mood. Color is considered a type of affective quality of the room. Analogously, certain design features of an e-commerce website may have the ability to change a user's mood, or to elicit affective evaluations regarding the website. We define affective cues (AC) as e-commerce website design features that have the ability to evoke a user's preliminary affective evaluations of the website. Possible affective cues include website color scheme, layout, shape, graphs, music, and overview, among others (e.g., Tractinsky et al., 2000, van der Heijden, 2003).

Perception of Positive Affective Quality and Perception of Negative Affective Quality

Different people may have different perceptions of the same affective quality of a stimulus (Russell, 2003). For example, big chunks of orange color on the walls in a room may be perceived exciting by one person, while upsetting by another. Perception of affective quality happens fast. It's one's immediate affective reaction toward a stimulus (Russell, 2003). Perception of affective quality can be positive or negative. We propose two types of affective evaluations users may have toward e-commerce websites. Perception of positive affective quality (PPAQ) is defined as an individual's perception that an e-commerce website has the ability to induce positive affect in him/her (e.g., how attractive a website is). Perception of negative affective quality (PNAQ) is defined as an individual's perception that an e-commerce website has the ability to induce negative affect in him/her (e.g., how annoying a website is). PPAQ and PNAQ are not affect, but affective evaluations.

PPAQ and PNAQ are expected to be two relevant but independent concepts instead of the two ends of one concept, just as Positive Affect and Negative Affect are two highly distinctive constructs (Watson et al. 1988). In most cases, a user's ratings on PPAQ and PNAQ would be toward opposite directions. However, it is possible that one may hold strong PPAQ (e.g., feeling a website is very exciting) and strong PNAQ (fairly overwhelming) toward a website at the same time.

PPAQ and PNAQ are different than many other affective concepts such as perceived enjoyment and attitude. PPAQ and PNAQ are evaluations of e-commerce websites, thus objects-based. A user can form PPAQ and PNAQ upon exposure to a website and prior to extensive interaction with it, thus with little deliberative processing. Most other affective constructs related with e-commerce websites are regarding the behavior of using websites, thus behavior-based. They are formed in the extensive exploration stage when one must have actions on the websites, thus involving more information processing. In addition, attitude toward behavior includes a cognitive component, while PPAQ and PNAQ don't (Ajzen, 2001).

Theoretical Model

Based on the technology acceptance model, the theory of planned behavior, the theory of reasoned actions, and the relationship between affect and cognition (Ajzen, 1991, Fishbein and Ajzen, 1975, Davis, 1989, Mehrabian and Russell, 1974, Zajonc, 1980), a model is proposed to describe how e-commerce website affective cues impact PPAQ and PNAQ, which in turn impact attitude and intention (Figure 1). Ten hypotheses are proposed on the left side of the model (from H1a, 1b to H5a, 5b). The right side has been established in the literature (from R1 to R9), thus is not discussed here.

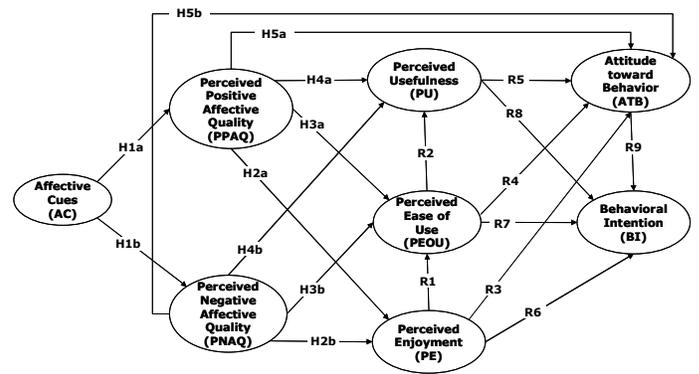


Figure 1. E-Commerce Website Evaluation & Use Intention

Behavioral intention (BI) refers to the strength of a person's willingness to use an e-commerce website (Davis, 1989, Fishbein and Ajzen, 1975). Attitude toward behavior (ATB) refers to a user's summative evaluation of the behavior of using an e-commerce website (Ajzen and Fishbein, 2005). Perceived usefulness (PU) is the degree to which a user believes using an e-commerce website would enhance his/her performance (Davis, 1989). Perceived ease of use (PEOU) is the degree to which a user believes using an e-commerce website would be free of effort (Davis, 1989). Perceived Enjoyment (PE) is the extent to which the activity of using an e-commerce website is enjoyable in its own right aside from the instrumental value of the site (Davis et al., 1992).

Impacts of Affective Cues on PPAQ and PNAQ (H1a, b)

An external stimulus with certain affective quality (cues) can directly impact a person's immediate affective responses to it (Mehrabian and Russell, 1974, Russell, 2003, Zajonc, 1980, Izard, 1993). A user can easily form perceptions regarding a website's positive and negative affective qualities upon a quick exposure, e.g., feeling the website is inviting, uncomfortable, and so on (Tractinsky, 2004, Fernandes et al., 2003, Lindgaard et al., 2006). Thus it seems plausible to posit that some e-commerce website design features (affective cues) can impact a user's perception of positive affective quality (PPAQ) and perception of negative affective quality (PNAQ). Hence, Hypotheses 1a and 1b are proposed (Figure 1).

Impacts of PPAQ and PNAQ (H2a,b, 3a,b, 4a,b, and 5a,b)

Perception of positive affective quality (PPAQ) and perception of negative affective quality (PNAQ) are evaluations toward objects. Perceived enjoyment, perceived ease of use, perceived usefulness, and attitude toward behavior are behavior-based. It is theoretically justified and empirically validated that object-based evaluations occur immediately and have an impact on behavior-based evaluations in psychology and social science (Ajzen and Fishbein, 2005). Immediate affective reactions to a stimulus occur via the biological system and influence succeeding cognitive and affective processes (Zajonc, 1980). Empirical evidences in information

system evaluations show that immediate affective evaluations can happen very rapidly, keep quite stable, and precede cognition (Norman, 2004, Tractinsky, 2004, Lindgaard et al., 2006). The automaticity of immediate affective reactions ensures that PPAQ and PNAQ precede and may color other affective and cognitive reactions, perceived enjoyment, ease of use, usefulness, and attitude that involve more deliberate information processing. Therefore, it seems reasonable to propose that PPAQ and PNAQ precede and impact perceived enjoyment, ease of use, usefulness, and attitude. Hence Hypotheses 2a, 2b, 3a, 3b, 4a, 4b, 5a, and 5b are proposed (Figure 1).

Utilitarian vs. Hedonic Tasks

The nature of tasks may influence the proposed model. A person may visit an e-commerce website for utilitarian or hedonic purposes. Utilitarian tasks are productivity-oriented, e.g., obtaining product information or completing transactions. Hedonic tasks are pleasure-oriented, e.g., browsing for fun (van der Heijden, 2004).

INTERVIEWS

In order to gain both in-depth and quantitative understanding about the validity of the proposed model, two empirical studies were conducted. One was face interviews. The other was an online survey. We presented the interviews in this section and the survey in the next section.

Ten individual-based semi-structured interviews were conducted face to face. Sixty e-commerce websites were selected as interview stimuli. They varied in a number of design aspects including color, layout, balance between texts vs. graphs, menu, shape, image, and so on. The participants were recruited from the students and staff in a major university in the northeast of the U.S. They were diverse in terms of demographics. Each participant viewed 10 screen shots of the selected websites, one at a time. For each screen shot, the participant was asked to describe his/her affective feelings about the website and recall those website design features that contributed to the feelings. Then he/she was encouraged to talk about his/her general experiences of using e-commerce websites, and whether and how exposure-based affective evaluations play roles in his/her interactions with e-commerce websites. Saturation was achieved with the first seven interviews.

Content analysis technique was used to analyze the interview transcriptions. The interviews showed that the participants did form immediate affective evaluations of the e-commerce websites based on very short exposures. It was easy for them to describe these immediate affective evaluations, i.e., PPAQ and PNAQ, using various adjectives such as pleasant, unpleasant, inviting, uninviting, exciting, boring, etc.

From the interviews, nine categories of e-commerce website design features have been identified to evoke

immediate affective evaluations in users. They are website layout, color scheme, images/icons, navigation, text, professional appearance, functional appearance, clarity of website purpose, and advertisement. These design features are considered affective cues of e-commerce websites. Most affective cues are manifested by multiple sub-cues.

The participants revealed that exposure-based, immediate affective evaluations had impacts on their beliefs, attitudes, intentions and behaviors toward using e-commerce websites. The impacts were especially significant when they were not in urgent needs to find or buy something and knew there were multiple choices on the Internet. More specifically, a website that evokes strong perception of positive affective quality (e.g., pleasant, comfortable, inviting, exciting) tends to induce positive beliefs, attitudes, and intention, thus attracts users to explore it. A website that evokes strong perception of negative affective quality (e.g., ugly, annoying, busy, boring) tends to induce negative beliefs, attitudes, and intention, thus drives users away.

ONLINE SURVEY

An online survey was conducted to test the proposed model quantitatively. Two business-to-customer e-commerce websites, Macy's and PriceGrabber, were selected as the survey stimuli. Both websites provided product descriptions, images, and customer ratings and reviews. But they were quite different in terms of affective cues including color schemes, layout, use of images, and navigation choices, etc.

Regular Internet users were recruited through emails via Dr. Stanton's StudyResponse Project. The participants were randomly assigned to one of two groups, each group visited one website. 326 useful responses were collected, 170 from Group 1 (Macy's) and 156 from Group 2 (PriceGrabber). The two groups were very similar in demographics.

A participant was first asked to view a target website without any action on it for a short time to form a first impression. Then he/she was asked to fill in a short questionnaire that measured affective cues, PPAQ, and PNAQ on 5-point Likert scales (instruments were developed in (Li, 2008)). Next, the participant was asked to use the target website for several minutes. Those who visited the PriceGrabber's website were required to find a high definition TV matching a list of given criteria, thus gained utilitarian experience. Those who visited the Macy's website were asked to browse freely and have fun, thus gained hedonic experience. Then he/she was guided to mark his/her perceived enjoyment, ease of use, usefulness, attitude toward using the website, and intention to use it with validated instruments on 5-point Likert scales (Wixom and Todd, 2005, Davis et al., 1992, Yi and Hwang, 2003, van der Heijden, 2004, Coyle and Thorson, 2001, Jiang and Benbasat, 2003, Ajzen and Fishbein, 2005).

Data in Group 1 (hedonic) and Group 2 (utilitarian) were analyzed independently using PLS-Graph 03.00. The measurement models were examined with confirmatory factor analyses. All measurement scales except one item of perceived usefulness (PU1) showed satisfactory convergent validity and discriminant validity. PU1 was then removed from further analyses. The structural models of the two groups were shown in Figures 2 and 3.

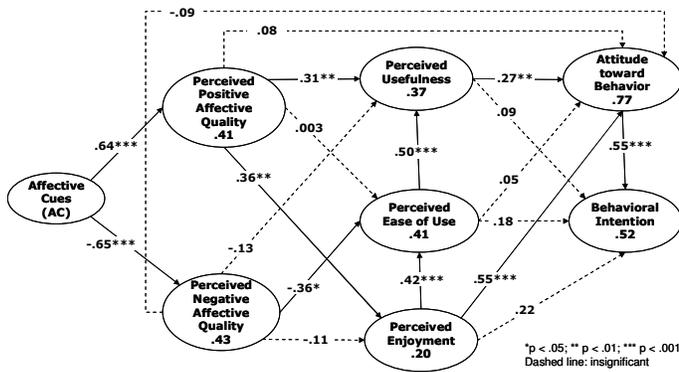


Figure 2. Empirical Model of Group 1 (Hedonic)

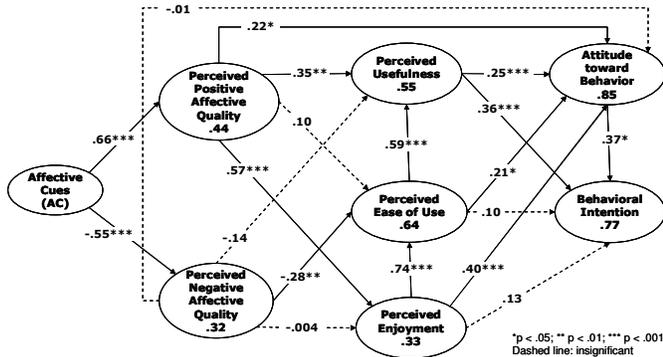


Figure 3. Empirical Model of Group 2 (Utilitarian)

In both hedonic and utilitarian situations, affective cues showed strong positive impact on perceived positive affective quality (PPAQ) and strong negative impact on perceived negative affective quality (PNAQ). Thus H1a and H1b are both supported. In the hedonic situation, 41% of variance in PPAQ and 43% in PNAQ were explained by affective cues. In the utilitarian situation, 44% of variance in PPAQ and 32% in PNAQ were explained by affective cues.

PPAQ showed significant positive impacts on perceived enjoyment and usefulness in both groups. Thus H2a and H4a are supported. PPAQ didn't show strong impact on perceived ease of use in either situation. Thus H3a is not supported. PPAQ had a direct positive impact on attitude in the utilitarian situation but not in the hedonic one, thus H5a is partially supported.

In both hedonic and utilitarian situations, PNAQ showed significant negative impacts on perceived ease of use. Thus H3b is supported. But it didn't show significant impact on perceived enjoyment, usefulness, or attitude. Thus H2b, H4b, and H5b are not supported.

CONCLUSIONS

Discussions

PPAQ and PNAQ demonstrated different impacts on perceived enjoyment, ease of use, usefulness, and attitude. It shows that PPAQ and PNAQ are two distinctive concepts rather than two ends of one concept.

Both the interviews and survey reveal that an e-commerce website's affective cues have significant and large impacts on PPAQ and PNAQ of the website. This is found to be true regardless of whether the users are using a website for hedonic or utilitarian purposes. It indicates that website design features do have the ability to quickly induce positive and negative affective evaluations of the website.

The strong impacts of PPAQ on perceptions of enjoyment and usefulness in both hedonic and utilitarian use situations indicate that if a user has strong positive affective evaluation of a website, then he/she is very likely to find his/her interaction with the website enjoyable and useful. The strong impact of PNAQ on perception of ease of use indicates that a strong negative affective evaluation based on exposure could easily lead to the conclusion that a website is difficult to use. A poorly designed website that evokes strong negative feelings could lose its chance to be further explored. The consistent findings in the hedonic and utilitarian situations indicate that the proposed model is quite reliable in the e-commerce website evaluation and use settings.

Contributions

This paper provides both qualitative and quantitative understandings on the antecedents and essential impacts of exposure-based affective evaluations (PPAQ and PNAQ) of websites on behavior-based affective evaluations, beliefs, attitude, and use intention by regular Internet users who want to use e-commerce websites for hedonic or utilitarian purposes on a voluntary base. Further, the proposed model may be useful for understanding user evaluation, acceptance and usage of other information systems such as educational applications, information websites, and entertaining systems, among others. The list of affective cues identified in this study may provide useful tools to practitioners to build better websites, attract more customers, and enhance customers' experience from the affective perspective.

Limitations and Future Directions

This is one of the pioneer steps in investigating the roles of affective cues and exposure-based affective evaluations in the e-commerce setting. We acknowledge that other potential moderators such as prior experience, culture, and trust may influence the model. Including these factors in the model is one future direction.

In this study, affective cues were measured by user evaluations, rather than objective assessment. This may bring some question to the validity of the findings. In future, manipulations of affective cues can be done by building multiple interfaces with the same content but different affective cues.

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