INDIVIDUAL DIFFERENCES IN THE CENTRALITY OF VISUAL AESTHETICS IN THE ONLINE CONTEXT: CONCEPT AND MEASUREMENT

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ABSTRACT

This research explores and validates measure of individual differences in the centrality of visual aesthetics (CVA) which influence online users' evaluations and responses to websites. The study extends previous research by adapting the measure of individual differences of aesthetics from the marketing literature and validate the measure in the online context. The results from an experiment demonstrate that online users' CVA signal their bias in the judgments of website visual appeal, ease-of-use, trust, and intention to use websites. In addition, we also found that the effects of CVA tend to be stronger in websites with relatively low visual appeal.

Keywords: Individual Differences in the Centrality of Visual Aesthetics, Website Design, Visual Appeal, Trust, Intention to Use

INTRODUCTION

Several studies in Information Systems (IS) and human-computer interaction (HCI) domains have suggested that online users' expectation of websites will not only be functional, but also engaging and enjoyable to use (Éthier, Hadaya, Talbot, & Cadieux, 2006, 2008; Overbeeke, Djajadiningrat, Hummels, Wensveen, & Frens, 2003; van der Heijden, 2004). Consequently, it is important for online vendors to design websites that provide users with both usability and a pleasing experience. Moreover, today's website criteria for online users is no longer merely about whether a website is efficient and effective, but how well it is able to engage users and provide them with enjoyable experience (Bannon, 2005). Such a changing paradigm of website criteria is consistent with literature on experiential marketing that a product should no longer be seen as simply providing functional features; however, customers want products "that dazzle their senses, touch their hearts and stimulate their minds" (Schmitt, 1999). The notion from the marketing literature that functionality and usability is just not enough is embraced by the IS and HCI communities and has been applied in several interface design areas including software development, website design, and mobile applications. Specific to the current investigation, most research on website design have focused on evaluating design features that affect users' overall experience with websites, including navigability (Cyr, 2008; Wells, Valacich, & Hess, 2011), color (Cyr, Head, & Larios, 2010), information presentation format (Hong, Thong, & Tam, 2004b; Nadkarni & Gupta, 2007), website visual complexity (Deng & Poole, 2010), human

image (Cyr, Head, Larios, & Pan, 2009; Hassanein & Milena, 2007), visual aesthetics (Fogg et al., 2003; Schenkman & Jönsson, 2000; Schlosser, White, & Lloyd, 2006), and multimedia content (Hong, Thong, & Tam, 2004a).

In the marketing literature, visual aesthetics has been found to influence consumers' perceptions in several ways. Studies have suggested that superior visual product designs distinguish products from competitors and help gain recognition in a crowded marketplace (Bloch, 1995; Schmitt & Simonson, 1997). Visual aesthetics influence the formation of consumer/product relationships since it is the first attribute of a product that connects with potential buyers through a sensory experience, which further shapes their judgments of the product regardless of product class (Hollins & Stuart, 1990).

Although website design features have been explored extensively in the past decade, nevertheless most studies focus on the impact of website design from designer perspectives while few studies have attempted to examine such impact from user perspectives. An empirical study on the user perspectives can provide a better understanding of how website design features constitute engagement and improve user experience.

Thus, this study aims to address the extent and important of the impact of website visual design on user responses in online shopping context. User responses to visual aesthetics may be influenced by user characteristics (e.g., aesthetic dispositions, aesthetic experience, and aesthetic expectation) that have not yet been analyzed in most studies in the website design domain.

According to Tractinsky and Lowengart (2007), there are two major antecedents of users' perceptions of aesthetic qualities of a web store which include consumer characteristics and design characteristics. Studies of website design have intensively explored the website design characteristics (Agarwal & Venkatesh, 2002; Cyr, 2008; Flavián, Guinalíu, & Gurrea, 2006; Lederer, Maupin, Sena, & Zhuang, 1998; Palmer, 2002; Schlosser et al., 2006; Webster & Ahuja, 2006; Wells et al., 2011); however, research into the user characteristics area is limited in the literature and further research is needed to clarify the issues (Hassanein & Milena, 2004). Nevertheless, few studies have provided evidence of a relationship between user individual differences in aesthetic perceptions and behavioral responses which has not been investigated in HCI domain. The first evidence of the impact of user characteristics on website aesthetic evaluation was found by Tractinsky et al. (2006). The results of their study revealed that there were differences in the participants' average ratings of the set of 50 web pages. Whereas some participants rated the entire set of web pages as fairly unattractive, other participants rated it much higher. Another evidence was provided by Cyr et al. (2009; 2010) who found that there are differences of reaction to website color schemes among participants from different cultures (Canadians, Germans, and Japanese).

Therefore, it is interesting to investigate whether users' aesthetic preferences play a role in their evaluation and their subsequent interactions with websites; consequently, the major research question of the study is "What is the impact of individual differences in perceptions of visual aesthetics on users' emotional responses toward a website?"

In order to answer this research question, we drew the concept of the individual differences in the centrality of visual product aesthetics (CVPA) (Bloch, Brunel, & Arnold, 2003) from marketing literature into the website design research domain. The major objective of this study is to examine the measure of CVPA in the online context.

BACKGROUND AND THEORETICAL FRAMEWORK

Individual Differences in the Centrality of Visual Aesthetics (CVA)

We account for individual differences in users, as it relates to visual appeal, by drawing on the concept of centrality of product aesthetics (CVPA) from the marketing literature (Bloch et al., 2003). According to Bloch et al. (2003), CVPA is defined as "the level of significance that visual aesthetics hold for a particular consumer in his/her relationship with products." They suggested that CVPA encompasses three related dimensions: (1) acumen, or the ability to recognize, categorize, or evaluate product designs, (2) the value a consumer assigns to product appearances in enhancing personal and even societal well-being, and (3) the level of response to visual design aspects of products (Bloch et al., 2003).

In the website design domain, an evidence of the impact of individual differences in aesthetic perceptions on user response has been found in Tractinsky et al.'s study (2006). In the central experiment conducted by Tractinsky et al. (2006), participants rated visual attractiveness of 50 web pages. The findings exhibited that the participants' average ratings of the web pages were not consistent – whereas some participants rated the entire set of web pages as fairly unattractive, other participants rated it much higher. This could be an evidence that people may differ in their ability to distinguish nuances in visual design.

Consequently, the major purpose of this study to investigate whether CVA can potentially moderate the relations between key factors of online commerce success including perceived visual appeal (Cyr, 2008; Cyr et al., 2010), perceived ease of use (Nadkarni & Gupta, 2007; van der Heijden, 2004; Webster & Ahuja, 2006), trust (Jarvenpaa, Tractinsky, & Vitale, 2000; Kim, Ferrin, & Rao, 2009; McKnight & Chervany, 2001; McKnight, Cummings, & Chervany, 1998), and intention to use website (Lim, Sia, Lee, & Benbasat, 2006; Pavlou, 2003; Pavlou & Fygenson, 2006). Therefore, we propose the following hypotheses.

Hypothesis 1: The influence of website visual appeal on online users' perception of website visual appeal is moderated by CVA; that is, website visual appeal will have greater effect on the users' perception of website visual appeal for user with higher CVA as compared to users with lower CVA.

Hypothesis 2: The influence of website visual appeal on online users' perception of ease-of-use of a website is moderated by CVA; that is, website visual appeal will have greater effect on the users' perception of ease-of-use for user with higher CVA as compared to users with lower CVA.

Hypothesis 3: The influence of website visual appeal on online users' trust of a website is moderated by CVA; that is, website visual appeal will have greater effect on the users' trust for user with higher CVA as compared to users with lower CVA.

Hypothesis 4: The influence of website visual appeal on online users' intention to use a website is moderated by CVA; that is, website visual appeal will have greater effect on the users' intention to use for user with higher CVA as compared to users with lower CVA.

METHODOLOGY

A total of 99 undergraduate students enrolled in a major Midwestern university participated in the experiment (25 females and 74 males). A unit of extra course credit was offered as an inducement. An experimental website was created in order to ensure that it is unfamiliar to participants to avoid branding effect. Furthermore, even though we manipulated the levels of visual appeal, we attested realism of the interface design of the experimental website by closely mimic websites of real charitable organizations. A charity website was selected for this study as it provides services, such that participants' perception of website visual appeal would not be confounded by products' attributes such as aesthetics, price, or features. In addition, all the three conditions provide the same information, content, and features to avoid effects from other variables that my impact the observed variables.

The experiment was conducted in a computer lab in multiple sessions. Participants were randomly assigned to one of the three website conditions and then they were asked to perform a hypothetical task which is considering to make an online donation to Japan's tsunami victims in 2011. After viewing the website, participants were asked to rate visual appeal, trustworthiness, perceived ease-of-use, and intention to use the website they just saw as well as to rate their CVA. There were no time limits to view the website and complete the questionnaire.

RESULTS AND CONCLUSION

We first performed manipulation checks of website visual appeal by using ANOVA. Participants exposed to website treatments with higher level of website visual appeal were more likely to agree that the website is more visually attractive than those assigned to website with lower visual appeal. Therefore, the manipulations on website visual appeal was deemed successful.
The data set contains a total of 91 usable responses. The sample consisted of 24 females (26.4 percent) and 67 males (73.6 percent). The majority of the subjects were between 18 and 21 years old (59.6 percent). From all the participants, 84 participants (92.3 percent) checked or sent email messages everyday and 26 participants (28.6 percent) made 1-3 online purchase per month.

CVA Measure Assessment

The CVA measure was assessed for the construct quality by testing reliability and convergent validity. An exploratory factor analysis (EFA) was conducted to explore the underlying dimensions of the CVA measure as a one-factor second-order model. The results demonstrate that the CVA measure is comprised of three conceptual sub-dimensions as in concert with results from previous work on CVA (Bloch et al., 2003).

We then conducted confirmatory factor analysis (CFA) to examine convergent validity of the CVA construct. The results demonstrate that there are relatively high correlations between measures of the same construct. As a rule, items in their corresponding construct load highly if

the loading coefficient is above 0.6, and do not load highly if the coefficient is below 0.4 (Hair, Tatham et al. 1995). However, we found that there are two items that do not load well on their corresponding dimension of CVA (VAL2 and RES1). Therefore, these two items were removed from the analysis. CFA results from the Varimax rotation as well as Cronbach's alpha and item loadings are presented in Table 1.

Table 1. Construct Validity of the CVA Measure

| CVA Dimension	Construct Items	Item	Factor		
			1	2	3
Value	VAL1	I enjoy seeing websites that have superior designs.	**.982**	.138	.119
Alpha = .800	VAL3	Beautiful website design makes the Internet more attractive to surf.	**.646**	.114	.203
Acumen	ACU1	Being able to see subtle differences in website designs is one skill that I have developed over time.	.124	**.748**	.050
Alpha =.873	ACU2	I see things in a website's design that other people tend to pass over.	.051	**.884**	.174
	ACU3	I have a pretty good idea of what makes one website look better than its competitors.	.172	**.825**	.198
Response	RES2	If a website's design really captures my attention, I feel I must use it.	.145	.157	**.977**
Alpha = .935	RES3	When I see a website that has a really great design, I feel a strong urge to use it.	.234	.180	**.837**

The Effects of CVA on Website Evaluations

A further analysis was conducted to examine if CVA levels influence users' evaluations of websites that differ in aesthetic quality. Our main hypothesis is that high CVA users should be more discriminating than low CVA users in their evaluations of the dependent variables (perceived visual appeal, perceived ease-of-use, trust, and intention) to use to designs with high versus low visual appeal websites. Therefore, in order to test the proposed hypothesis, a 3×3 factorial design was used. The website visual design manipulations were between-subject (subjects saw only one of the three website conditions: low visual appeal, moderate visual appeal, and high visual appeal websites). An overall CVA score was computed for each subject from the items highly loaded on the three sub-dimensions of CVA measure. The mean CVA score for this sample is 6.42 (SD = 1.21). To test the hypothesis, the sample was divided into three groups by CVA scores and a series of two-way ANOVA was conducted using 3×3 design (3 levels of website visual appeal vs. 3 levels of CVA). Mean score for the high CVA subject group (n = 30), moderate CVA subject group (n = 30), and low CVA subject group (n = 31) are 7.69 (SD = .48), 6.57 (SD = .23), and 5.06 (SD = .78), respectively.

According to the results of a series of ANOVA on perceived visual appeal, perceived ease-of-use, trust, and intention to use, the results indicate that the three conditions of website visual

appeal are significantly different on perceived visual appeal ($F = 80.04$, $p < .000$), perceived ease-of-use ($F = 9.43$, $p < .000$), trust ($F = 16.50$, $p < .000$), and intention to use ($F = 28.06$, $p < .000$). With regard to the interaction effects of CVA and website visual appeal, even though the effects are in predicted direction, especially for low CVA groups, the interaction effects are not statistically significant on perceived visual appeal, perceived ease-of-use, trust, and intention to use. Figure 1 represents means and standard deviations of the dependent variables on the three website conditions and CVA groups.

Figure 1. Means and Standard Deviations of the CVA Groups and Website Conditions

— High Visual Appeal Website   •••• Moderate Visual Appeal Web   – • Low Visual Appeal Website
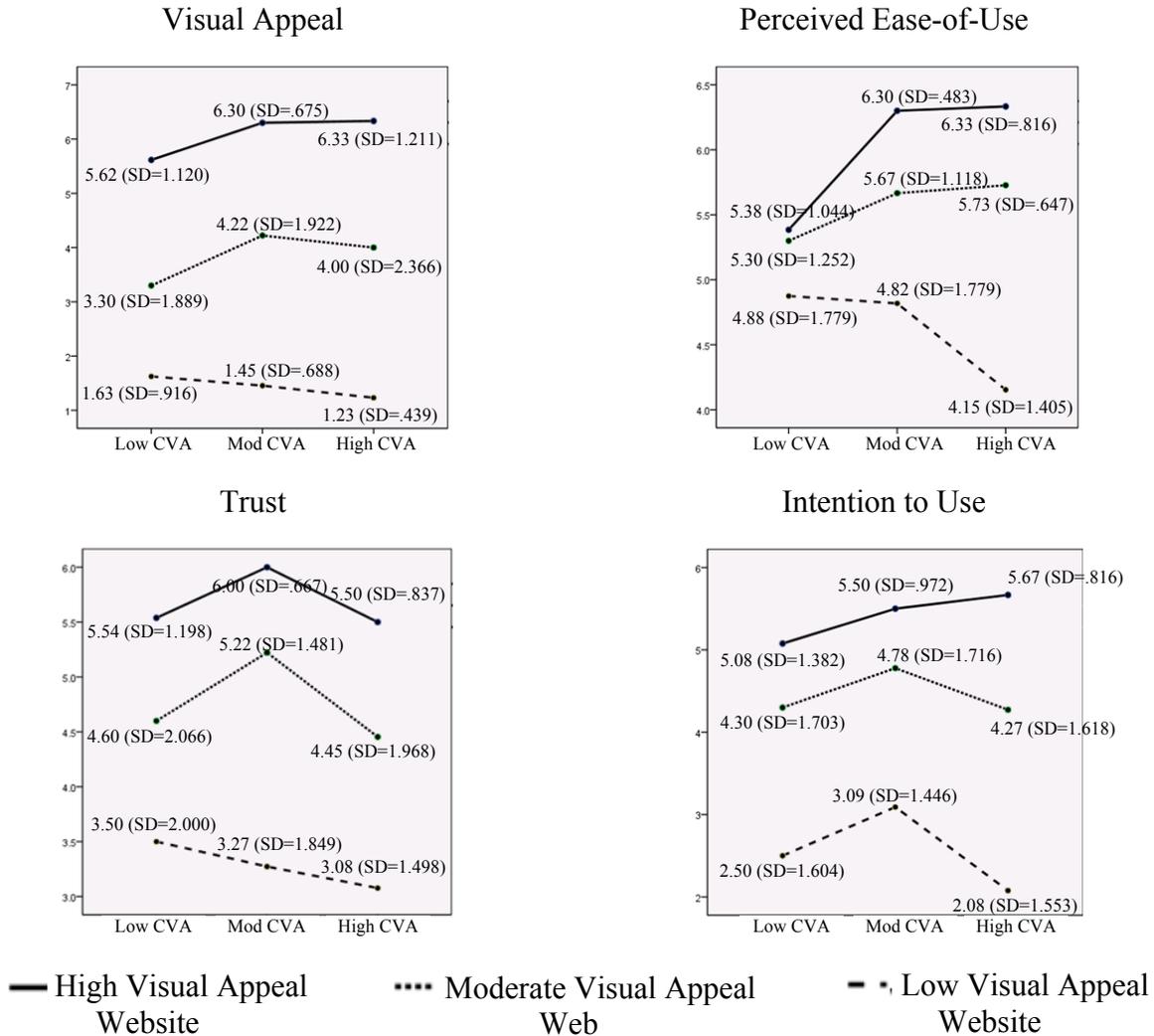
Conclusion

Visual appeal has become strong predictor of online commerce success. However, online customers may have different levels of significance that visual aesthetics hold in their perceptions and responses to websites. This is indicated by CVA which has not been well

illuminated in past research, especially in the online context. The intention of this research is to validate the CVA measure adapted from marketing literature into IS domain. This study not only fills gaps in the understanding of customers perceptions and responses to website visual design, but also has the potential to further our understanding of a number of customer behaviors, such as engagement, approach-avoidance, and e-loyalty.

In this study, CVA appears to be both a theoretically and managerially relevant construct and its scales possess acceptable reliability and validity. This is in line with the original CVA measure (Bloch, et al., 2003). Overall, the results of this study demonstrate that online customers' evaluations of websites are influenced by the perceived value attached to superior website visual design, abilities in understanding and evaluating website visual appeal, and the level of responses to website aesthetics. However, it should be noted that CVA exhibits stronger impact on customers' evaluations for websites with less visual appeal then website with high visual appeal.

As set out in the introduction, the objective of this research is to explore and validate individual differences in the centrality of visual aesthetics in the online context. There are also several areas of research expansion regarding CVA that appear profitable in online setting. Further research could address limitation of the present study by exploring additional approach to measure aesthetic centrality in the online context. In subsequent study, researchers could also determine whether concern with visual aesthetics is allied with different design features of a web page, such as color, layout, or graphics. It might also prove profitable to explore how different levels of website visual appeal interact with CVA. In addition, it would be worthwhile to see if the CVA scale may also have application in cross-cultural research since visual design may have different impact on culturally diverse viewers.

To conclude, this research has broadened our understanding of the roles of website visual appeal in online consumer behavior as well as bringing needed attention to individual differences in perceptions and responses to website visual appeal.

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