

Effect of Website Aesthetics on Approach Intention

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Abstract

Designing purchasing environment that produce specific emotional effects in the buyer might enhance purchase probability. However, studies on effect of website aesthetics on emotion and behavior intention seem to be limited. Therefore, the purpose of this study is to investigate the effect of visual aesthetics on approach/avoidance intention and the mediating role of emotional responses. Overall, 116 subjects participated in the experiment. A repeated measure design with three levels of website aesthetics which are classical, expressive, and low aesthetics was employed to investigate the emotional response and approach/avoidance intention. The results show that aesthetics of website affects emotional responses and that the emotions affect approach/avoidance intention. The design factors, which induce higher pleasure or arousal, will produce higher approach intention.

Keywords: web design, aesthetics, emotional response, online behavior

網站設計美感對線上行為傾向的影響

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摘要

設計能夠引發特定情緒反應的購物環境，可能可以增加購物的機率，然而，過去有關網站設計美感對情緒和行為傾向的相關研究並不多見，因此，本研究的目的是調查網站的視覺設計美感對情緒和趨近行為傾向的影響，同時也調查了情緒在網站美感與趨近行為傾向間所扮演的中介效果。共有 116 位受試者參加研究實驗，實驗設計以重複量測實驗，調查網站設計美感的三個水準（古典美感、明示美感和低美感）對

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情緒和趨近行為傾向的影響。結果顯示，網站設計美感會影響情緒反應和趨近行為傾向。同時美感設計因子中能夠誘發較高愉悅或亢奮情緒者，也能誘發較高的趨近行為傾向。

關鍵詞：網站設計、美感、情緒反應、線上行為

1. Introduction

Designing purchasing environment that produce specific emotional effects in the buyer might enhance purchase probability (Kotler, 1973). Inspired by Kotler (1973), the design of store atmosphere has been receiving extensive attention. Donovan and Rossiter (1982) conducted the first empirical test of the retail atmosphere. Their study found that environmental stimuli significantly affect emotional states characterized by pleasure and arousal and affect the approach or avoidance response.

Although previous studies focused considerably on environmental store effects on purchasing behavior in traditional retail stores (Turley and Milliman, 2000), only limited number of studies focused on the effect of these atmospheric factors in the context of online store. Based on the Stimulus-Organism-Response (S-O-R) model from environmental psychology, Eroglu et al. (2001) proposed a model in which the online atmospheric cues influence affective and cognitive internal states leading to approach/avoidance behaviors. Because online browsing is mainly a visual task, it is a need to understand how visual design of a website affects browsers' online behaviors.

For website design, a bundle of specific visual design elements, such as color scheme, graphics/images, text, layout, as well as proportion of text and images etc., have been manipulated to test the usability, preference, performance and online intentions (Hall and Hanna, 2004; Schaik and Ling, 2008; Schenkman and Jonsson, 2000). For the visual aesthetic design, Tractinsky (2004) argued that aesthetics is important for information technology research and practice because (1) for many users, other aspects of the interaction hardly matter anymore, (2) our evaluation of the environment is primary on visual, and the environment becomes increasingly filled up with information technology, (3) aesthetics satisfies basic human needs, and information technology increasingly satisfy human needs. However, studies on the effect of aesthetics of websites on emotion



and behavior intention seem to be limited. Thus, the issue of aesthetics of website design should receive extensive examination. Accordingly, the purpose of this study is to investigate the effect of website aesthetics on approach/avoidance intention and the mediating role of emotional responses.

2. Theoretical background and hypotheses

2.1 Theoretical background

Since Mehrabian and Russell (1974) introduced a model of human emotion commonly used in marketing studies, a number of studies have applied the model to study store environment (e.g., Donovan and Rossiter, 1982; Eroglu et al., 2001; Sherman et al., 1997). The Mehrabian and Russell's (1974) model (M-R model) is based on S-O-R from environmental psychology. The model claims that the environment (S) leads to approach/avoidance behaviors (R) and that emotional state (O), which are induced by the environmental stimuli, mediates this relation. The model proposes three emotional states, which are pleasure-displeasure, arousal-nonarousal, and dominance-submissiveness. Pleasure-displeasure refers to the degree which a person feel good, joyful, happy or satisfied in the situation; arousal-nonarousal refers to the degree which a person feels excited, stimulated, alert or active in the situation; and dominance-submissive refers to the extent which an individual feels in control of, or free to act in, the situation (Donovan and Rossiter, 1982). In other words, pleasure-displeasure dimension reflects the feelings of happy-unhappy, pleased-annoyed, satisfied-dissatisfied, contented-melancholic, hopeful-despairing, and relaxed-bored. Arousal-non arousal dimension distinguishes the feelings of frenzied-sluggish, jitter-dull, aroused-non aroused, stimulated-relaxed, and excited-calm. The dimension of dominance-submissiveness reflects the extent of feeling influential, in control, important, autonomous or submissive, and passive and lacking control. Although there are three emotional states, which are pleasure, arousal and dominance, in the M-R model, the role of dominance is not a good predictor of approach/avoidance behavior, according to the previous studies (e.g., Donovan and Rossiter, 1982; Donovan et al., 1994; Russell and Pratt, 1980). Therefore, the role of dominance was not investigated in this study.

Previous studies on the effects of atmosphere of a retail store on emotional states, defined in terms of pleasure and arousal, as well as shopping behaviors found that atmosphere of retail can be important and can influence emotional states and shopping



behaviors. Donovan and Rossiter (1982) reported a positive relationship between pleasure and arousal and intention to stay and spend more. In a large-scale cross-sectional field study, Sherman et al. (1997) identified and explored how store environment and emotional states may influence various dimensions of purchase behavior. The results found that consumer's emotions could mediate the purchase process. Although cognitive factors may largely account for store selection and for most planned store purchases, the environment in the store and the emotional states of consumers may be important determinants of purchase behavior. For the online store, Eroglu et al. (2003) showed that emotional states play an intervening role in shopper's attitude, satisfaction, and various approach/avoidance behaviors. Since aesthetics is an important design factor that affects the atmosphere of a website, we believe that M-R model is suitable for measuring the effect of aesthetic design of a website on approach/avoidance behavior.

2.2 Website aesthetics, emotion and approach/avoidance intention

Considering the aesthetics of a website, Lavie and Tractinsky (2004) concluded that users' perception of website aesthetics consists of two main dimensions, which are termed 'classical aesthetics' and 'expressive aesthetics'. The classical aesthetics dimension emphasizes orderly and clear design and relates to many design rules advocated by usability experts. The expressive aesthetics dimension represents designers' creativity, originality, and the ability to break design convention.

Based on Lavie and Tractinsky's (2004) two dimensions aesthetic perception of a website, three types of aesthetic websites, which were classical, expressive and low aesthetic websites, were used in the present study. For the classical aesthetic website, the perceived classical aesthetic score was significantly higher than expressive aesthetic website and low aesthetic website. On the other hand, the perceived expressive aesthetic score for expressive aesthetic website was significantly higher than classical aesthetic website and low aesthetics website. However, for the low aesthetic website, both the perceived classical and expressive aesthetic scores were relatively lower than the classical aesthetic website and expressive aesthetic website, respectively.

Aesthetic design product can affect states of emotion through sensory pleasure. Bloch (1995) argued that aesthetic responses engage attention and induce strong positive emotions from the design and sensory properties of the product. In addition, Tzou and Lu (2009) found that aesthetic facet is the vital determinant to acceptance intention for the fashion technology product. Concerning online store, Lavie and Tractinsky (2004)



speculated the strong positive correlation between aesthetic dimensions and emotional states. They argued that the pleasant/unpleasant dimension seems to correspond more to high/low levels of classical aesthetics, respectively, while the arousal dimension corresponds more to levels of expressive aesthetics.

In addition, Fiore et al. (2005) investigated the relationships among hedonic value, emotional states, consumer characteristics, and response toward apparel websites that featured by image interactivity. The results revealed positive relations among hedonic value, pleasure, and arousal. In their study, the image interactivity-featured websites were considered as creativity, originality, and breaking design convention. These features are elements describing expressive aesthetics of a website in the present study. Because expressive aesthetics creates more hedonic value, we assume that expressive aesthetics of website can produce not only arousal, but also pleasant emotion. In contrast to the expressive aesthetics, classical aesthetics relates to conventional design notions, which are expected to arouse a peaceful emotional state that may not induce higher arousal response. Accordingly, we can infer the following hypotheses:

- H1: Classical and expressive aesthetics of websites induce higher pleasant emotion compared to low aesthetics.
- H2: Expressive aesthetics of website induce higher arousal emotion compared to classical and low aesthetics of website.

Mehrabian and Russell (1974) suggested that shoppers react to an environmental situation in one of the two ways, approach or avoidance. Approach behavior is a positive reaction to an environment, such as a desire to stay and to explore it. Avoidance behavior reflects negative response, such as refusing to stay or explore it. Considering an online environment, Eroglu et al. (2003) suggested four items representing approach/avoidance intention, which assess time spent on the site, enjoyment exploring it, intended approach or avoidance of the site, and intention to avoid looking around. Because of the similar environmental stimuli, the present study adopted the measures of approach/avoidance intention suggested by Eroglu et al. (2003).

According to Sherman et al. (1997), store environment and emotional states may be important determinants of purchase intention. In the online context, after a critical review of online consumer behavior, Cheung et al. (2005) inferred that the medium characteristics such as web design will influence behavior intention. Furthermore, in a study of webpage design on readability, retention, aesthetics and behavioral intention, Hall and Hanna (2004)



found that preferred color led to higher ratings of aesthetic quality and purchase intention, and ratings of aesthetic quality were significantly related to purchase intention. These findings seem to indicate that the online environmental factor such as design aesthetics of website may affect behavior intention. Therefore we speculate that:

H3: High classical and expressive aesthetics of websites produce higher approach intention than low aesthetics of website.

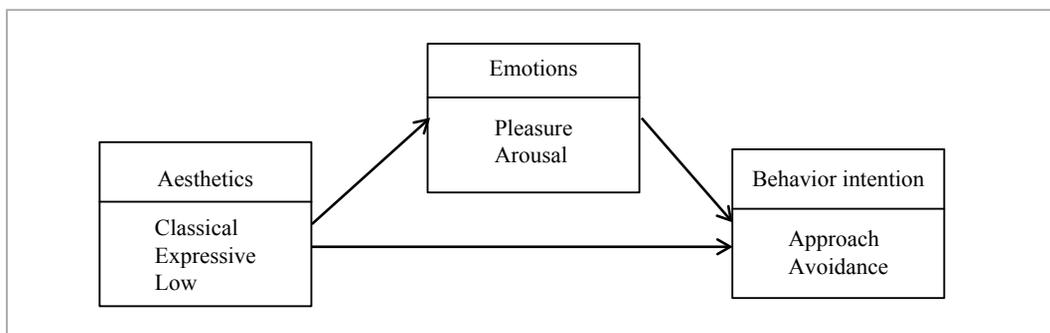
2.3 Emotion as mediator on approach/avoidance intention

Researchers have reported the mediating role of pleasure and arousal states in approach/avoidance behavior for both brick-and-mortar retail and online store environments (Donovan and Rossiter, 1982; Eroglu et al., 2003; Gilboa and Rafaeli, 2003; Sherman et al., 1997). Donovan and Rossiter (1982) found that shoppers exhibited more approach tendencies with higher pleasure and arousal. Eroglu et al. (2003) reported that shoppers who experienced higher pleasure and higher arousal had higher approach tendencies. Accordingly, we proposed the following hypothesis :

H4: Pleasure emotion will mediate the relationships of aesthetics of website and approach/avoidance intention.

H5: Arousal emotion will mediate the relationships of aesthetics of website and approach/avoidance intention.

Figure 1 shows the study model. The model suggests that pleasant and arousal states mediate approach/avoidance intention. Furthermore, the environmental stimulus, namely aesthetics, influences the emotional states and approach/avoidance intention.



▲ Figure 1 Study model.



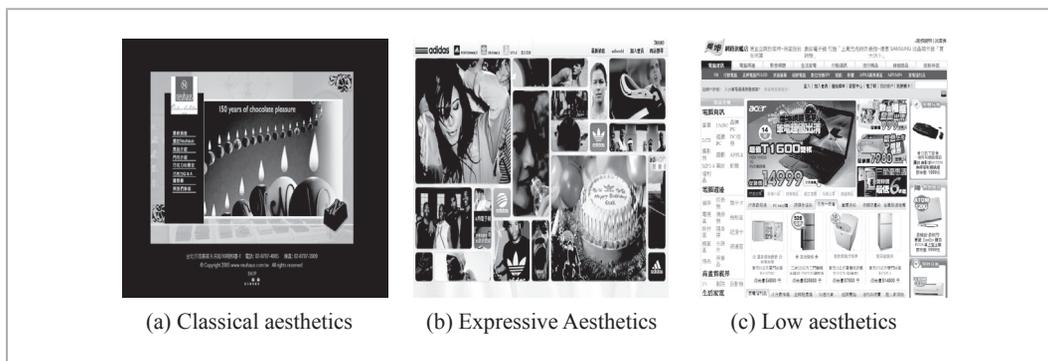
3. Method

For the purpose of the present study, a pre-test was conducted to evaluate the selection of aesthetic websites as experimental stimuli. Then, the formal study was carried out to investigate the effect of website aesthetics on approach/avoidance intention.

3.1 Pre-test

An initial pool of 10 websites selected from Taiwanese websites was investigated to extract the experimental websites. Overall, 30 subjects completed the website aesthetics scale proposed by Lavie and Tractinsky (2004) measured on a 7-point scale ranging from (1) 'strongly disagree' to (7) 'strongly agree' to evaluate aesthetics of the websites. The scale consists of two dimensions, which are classical aesthetics and expressive aesthetics. The classical aesthetics comprises adjectives such as clear, clean, pleasant, aesthetic and symmetrical; and the expressive aesthetics comprises adjectives such as original, fascinating, sophisticated, use of special effect, and creative. According to the perceived levels of classical and expressive aesthetics of the ten websites, three Taiwanese websites, which represent classical, expressive, and low aesthetics show in Figure 2, (a), (b) and (c), respectively, were selected from the pre-test as stimuli.

The criteria for the level combination of website aesthetics are as follows: for the classical aesthetic website, the perceived score of classical aesthetics was highest among the initial pool of websites and significantly higher than the other websites. Similar criteria, except the perceived score was expressive aesthetics, were adopted for the selection of the website with expressive aesthetics. The website that both perceived classical and expressive aesthetic scores were significantly lower than the other websites was selected as the low aesthetic website.



▲ Figure 2 Selected experimental Websites.



3.2 Manipulation checks

Table 1 shows the results of the pre-test for the selection of aesthetic websites. The subjects assessed the perceived classical aesthetics of the three selected websites showing significant difference ($F(2, 87)=15.25, p<0.01, \eta^2=0.260$). The results indicated that perceived classical aesthetics was significantly higher for the classical aesthetic website compared to the expressive and the low aesthetic websites. On the other hand, expressive aesthetics of the three selected websites showed significant difference ($F(2, 87)=16.55, p<0.01, \eta^2=0.276$). The results revealed that the expressive aesthetic website produced higher perceived expressive aesthetics compared to the classical and the low aesthetic websites. In addition, perceived expressive aesthetics was much higher for the classical aesthetic website compared to the low aesthetic website. In sum, the three selected websites could, according to the analyses, represent three manipulated levels of website aesthetics, which are classical, expressive, and low aesthetics of website.

▼ Table 1 Descriptive statistics of perceived aesthetics for selected websites (n=30).

Website Aesthetics	Perceived Aesthetics					
	Classical			Expressive		
	Mean	SD	Tukey's Grouping ^a	Mean	SD	Tukey's Grouping
Classical	28.13	0.93	A	21.10	1.20	B
Expressive	21.10	1.57	B	26.47	1.28	A
Low	19.43	0.94	B	16.93	1.04	C

^aThe different grouping letters indicate that means are significantly different using Tukey's Studentized Range test at $\alpha=0.05$.

3.3 Subjects

Overall, 116 graduate and undergraduate students who were recruited from National United University in Taiwan participated in the formal experiment. There were 40 males and 76 females, and their ages ranged from 18 to 26 years old. Fifteen subjects did not have the experience with online purchasing. More than 56.9% of the subjects surf the internet for more than 4 hrs. on average per day. All the subjects were rewarded a gift of NT\$ 120 for their participation.

3.4 Apparatus

The formal experiment was conducted in a computer laboratory with controlled ambient lighting and temperature. Each of the PCs was equipped with 2.4 GHz CPU and



17-inch screen with the resolution of 1280 × 1024.

3.5 Design

This study is a repeated measure design. The experimental factor is website aesthetics with three levels which are classical, expressive, and low aesthetics. Subjects were randomly assigned to one of the three experimental orders and each subject had to experience three aesthetic websites in a counter balance arrangement.

Mehrabian and Russell's (1974) 12-item semantic differential scale was slightly modified to measure emotional responses to online store context. The items on the emotion scale were presented as bipolar statements (e.g., happy-unhappy) measured on a 7-point scale. The pleasure dimension of emotion scale comprises happy-unhappy, pleased-annoyed, satisfied-unsatisfied, contented-melancholic, hopeful-despairing, and relax-bored. The arousal dimension comprises stimulated-relaxed, excited-calm, frenzied-sluggish, jittery-dull, wide awake-sleepy, and aroused-unaroused.

Eroglu et al.'s (2003) semantic differential items measured on a 7-point scale was employed to measure approach/avoidance intention. The scale consists of 'How much time would you like to spend on this website? Lots of time/Very little time,' 'Once at the site, how much did you enjoy exploring around? Enjoy exploring/didn't enjoy exploring,' 'Would you like to either approach or avoid this particular site while shopping? Approach/Avoid,' and 'Would you avoid looking around or exploring the site? Approach/Avoid'.

3.6 Procedure

Subjects browsed three websites with classical aesthetics, expressive aesthetics, and low aesthetics, respectively, in a counter balance sequence. Subjects were instructed to browse the experimental website for three minutes as if they were planning to purchase from the site. After browsing the website for three minutes, subjects were asked to finish the emotion and approach/avoidance intention scales according to their impression of the website they browsed for no longer than five mins. When subjects completed the scales, they repeated the same procedure for the second and third websites until they completed all the three sessions.



4. Results and discussion

The purpose of this study is to investigate the effect of website aesthetics on emotional responses, approach/avoidance intention and the mediating effect of emotional responses on the approach/avoidance intention. Descriptive statistics for the dependent measures across different experimental conditions was analyzed. Analysis of variance (ANOVA) was employed to analyze effect of website aesthetics on dependent measures, and eta squared (η^2) was used to estimate the effect size. Tukey's post hoc test was used as a follow up to significant main effects. In addition, Baron and Kenny's (1986) procedure was employed to examine the mediate role of pleasure and arousal on approach/avoidance intention.

4.1 Scales validity and reliabilities

Confirmatory factor analysis (CFA) was used to test the convergent validity and discriminant validity of the constructs of classical aesthetics, expressive aesthetics, pleasure, arousal and approach/avoidance intention. A series of scale purification processes were carried out to delete items that did not meaningfully load on the respective construct and those did not highly correlated to the other items that measure the same construct. Table 2 shows that after purification, most of factor loadings are higher than 0.7 and significant ($p < 0.01$) for the constructs except two of arousal items and one of classical aesthetics item which are a little bit lower than 0.7 but higher than 0.61. In addition, all the constructs' AVE (average variance extracted) are higher than 0.5. Therefore, we consider all the constructs meet the criteria for convergent validity (Anderson and Gerbing, 1988).

The inter-construct correlations were used to test the discriminant validity. Table 3 shows that all the constructs have stronger correlations with their own measures than the other constructs. Moreover, all the correlations between constructs are less than the square root value of AVEs which are appeared in the diagonal of the table showing the discriminant validity (Fornell and Larcker, 1981). Finally, all the Cronbach's α of the constructs are higher than 0.7 representing high internal reliability of each items used in each of the constructs.



Table 2 Results of construct purification.

Construct	Question item	Factor Loading	Cronbach's α	AVE ^a
Classical aesthetics	aesthetic	0.87	0.85	0.69
	pleasant	0.94		
	clean	0.66		
Expressive aesthetics	creative	0.95	0.92	0.75
	fascinating	0.81		
	use of special effect	0.82		
	original	0.87		
Pleasure	happy-unhappy	0.91	0.95	0.74
	pleased-annoyed	0.88		
	satisfied-unsatisfied	0.87		
	contented-melancholic	0.89		
	hopeful-despairing	0.84		
	relax-bored	0.78		
Arousal	excited-calm	0.75	0.83	0.53
	frenzied-sluggish	0.70		
	jittery-dull	0.88		
	wide awake-sleepy	0.68		
	aroused-unaroused	0.61		
Approach/avoidance intention	How much time would you like to spend on this website?	0.70	0.90	0.74
	Once at the site, how much did you enjoy exploring around?	0.93		
	Would you like to either approach or avoid this particular site while shopping?	0.91		
	Would you avoid looking around or exploring the site?	0.90		

^a Average variance extracted



▼ Table 3 Inter-construct correlation matrix.

	Approach/Avoidance intention	Classical aesthetics	Expressive aesthetics	Pleasure	Arousal
Approach/Avoidance intention	0.863				
Classical aesthetics	0.595	0.830			
Expressive aesthetics	0.479	0.746	0.864		
Pleasure	0.821	0.825	0.559	0.862	
Arousal	0.612	0.472	0.431	0.609	0.729

Note: Values shown in the main diagonal represent the square root of AVE.

4.2 Effect of website aesthetics on emotional states and approach/avoidance intention

Table 4 shows descriptive statistics for the dependent measures across different experimental conditions. In addition, ANOVA tests were performed to analyze the effect of website aesthetics on pleasure, arousal responses and approach/avoidance intention. The results, as shown in Table 5, indicate that website aesthetics has significant effect on pleasure ($F(2, 230)=35.47, p<0.01, \eta^2=0.236$), arousal ($F(2, 230)=16.46, p<0.01, \eta^2=0.125$) and approach/avoidance intention ($F(2, 230)=7.83, p<0.01, \eta^2=0.064$).

▼ Table 4 Descriptive statistics of dependent measures (n=116).

Dependent Variable	Website aesthetics			
	Classical	Expressive	Low	
Pleasure	Mean	34.85	32.49	28.33
	SD	5.95	7.02	6.99
	Tukey's Grouping*	A	B	C
Arousal	Mean	20.30	21.98	18.73
	SD	5.06	5.58	5.44
	Tukey's Grouping	B	A	C
Approach intention	Mean	20.52	20.43	17.98
	SD	5.29	5.80	5.90
	Tukey's Grouping	A	A	B

*The different grouping letters indicate that means are significantly different using Tukey's Studentized Range test at $\alpha=0.05$.



Table 5. ANOVA and mediation analysis

Source	ANOVA: Pleasure	ANOVA: Arousal	ANOVA: Approach/ Avoidance	ANCOVA: Approach/ Avoidance
Web aesthetics(W)	F(2, 230)=35.47**	F(2, 230)=16.46**	F(2, 230)=7.83**	F(2, 228)=6.59**
Covariates:				
Pleasure				F(1, 228)=187.23**
Arousal				F(1, 228)=22.63**

** P < 0.01.

For the pleasure dimension, the post hoc test reveals that the websites with classical aesthetics ($m=34.85$, $SD=5.95$) and with expressive aesthetics ($m=32.44$, $SD=7.02$) produces higher pleasure compared to low aesthetic website ($m=28.33$, $SD=6.99$). The results support H1 that the websites with classical and with expressive aesthetics induces higher pleasure compare to the low aesthetic website. However, result also shows that pleasure of the website with classical aesthetics significantly higher than the website with expressive aesthetics.

For the arousal, the post hoc test reveals that the website with expressive aesthetics ($m=21.98$, $SD=5.58$) induces higher arousal compared to the websites with classical ($m=20.30$, $SD=5.06$) and with low ($m=18.73$, $SD=5.44$) aesthetics. The hypothesis H2 is supported by the results that the website with expressive aesthetics produces higher arousal compared to the websites with classical and with low aesthetics. However, result also reveals that arousal of the website with classical significantly higher than the website with low aesthetics.

The findings support the model proposed by Porat and Tractinsky (2008) that website aesthetics influences consumers' affective states. Furthermore, the results evidence the speculation of Lavie and Tractinsky (2004) who argued that website with higher level of classical aesthetics evokes higher level of pleasure, and website with higher level of expressive aesthetics evokes higher level of arousal. However, Lavie and Tractinsky (2004) indicated that the correlation between pleasure and classical aesthetics was somewhat higher than that between pleasure and expressive aesthetics. This might explain why the classical aesthetic website produces higher pleasure than the expressive aesthetic website in the present study. On the other hand, Lavie and Tractinsky (2004) argued that arousal state corresponds to levels of perceived expressive aesthetics. In the present study, the



results of the pretest reveal that the perceived scores of expressive aesthetics among the websites with expressive, classical and low aesthetics are significantly different. The score of the website with expressive aesthetics is significantly higher than the website with classical aesthetics and the score of the website with classical aesthetics is significantly higher than the website with low aesthetics. These might explain why the arousal response of the website with classical aesthetics is significantly higher than the low aesthetic website in the formal experiment.

For approach/avoidance intention, the post hoc test reveals that the websites with classical aesthetics ($m=20.52$, $SD=5.29$) and with expressive aesthetics ($m=20.43$, $SD=5.08$) induce higher approach intention compared to the low aesthetic website ($m=17.98$, $SD=5.90$). There is no significant difference between classical and expressive aesthetic websites on approach intention. The results support H3 that the websites with classical and with expressive aesthetics produce higher approach intention compared to the low aesthetic website. The result is similar to the findings of Sherman et al. (1997) and Hall and Hanna (2004), and confirms the inference of Cheung et al. (2005) that medium characteristics such as web design will influence behavior intention. In the present study, we prove that the design of website aesthetics will affect approach intention of online users.

4.3 Mediation effect of emotion on approach/avoidance intention

The present study adopted a mediation effect procedure suggested by Baron and Kenny (1986). The procedure suggests a series of regression models that need to be estimated and that need to satisfy the following conditions. First, the independent variable must affect the mediator in the first regression. Second, the independent variable must affect the dependent variable in the second regression. Third, the mediator must affect the dependent variable while the effects of the independent variable on the dependent variable are reduced in the third regression.

First, previous ANOVA test (as shown in Table 5) shows that website aesthetics has significant effects on pleasure and arousal. Second, an ANOVA test (as shown in Table 5) shows that website aesthetics ($F(2, 230)=7.83$, $p<0.01$, $\eta^2=0.064$) significantly affects approach/avoidance intention. Third, analysis of covariance (ANCOVA) was carried out to test the effects of the two mediators (pleasure and arousal) on approach/avoidance intention. In this analysis, the mediators are treated as covariates. The result indicates lower magnitude of the overall effect of website aesthetics on approach/avoidance intention



compared to the direct effect of website aesthetics on approach/avoidance intention when partialling out the mediators, as shown in Table 5. Moreover, the two covariates, which are pleasure ($F(1, 228)=187.23, p<0.01, \eta^2=0.415$) and arousal ($F(1, 228)=22.63, p<0.01, \eta^2=0.050$), also show significant effects on approach/avoidance intention.

In addition, a regression analysis was also used to investigate the effects of pleasure and arousal on approach/avoidance intention. The results reveal significant regression model ($F(2, 345)=263.52, p<0.01, \text{adjusted } R^2=0.60$), which indicate that both pleasure ($\beta=0.54, t(1)=16.56, p<0.01$) and arousal ($\beta=0.18, t(1)=4.35, p<0.01$) produce significantly positive effects on approach/avoidance intention.

The above results show that both pleasure and arousal mediate the effects of website aesthetics on approach/avoidance intention. Thus, the hypothesis of H4 and H5 are supported. However, analysis also reveals that although effect of website aesthetics on approach intention was reduced after added the mediators of pleasure and arousal, the influence of website aesthetics on approach intention remains significance which means that the direct effect of website aesthetics on approach/avoidance exists. This result supports the proposed model in the present study.

The results re-confirmed that the emotional states (pleasure and arousal) are important mediators in the R-M model (Mehrabian and Russell, 1974), which is useful for studying the atmosphere of online store on consumers' behavior. In the present study, website aesthetics is an important design factors affecting emotional states of subjects, which further affect the approach/avoidance intention. In other words, consumers who experience more pleasure and arousal emotions in an online environment demonstrate more approach rather than avoidance tendencies. The finding is consistent with the studies of Eroglu et al. (2003) and Wu et al. (2008) that subjects who experienced higher pleasure and higher arousal showed higher approach intention. In addition, according to the ANCOVA, pleasure has the strongest effect on approach/avoidance intention, which is similar to the finding of Porat et al. (2007).

The results imply that online store operators should take website aesthetics into account while online shoppers' experienced levels of pleasure and arousal are good predictors of approach/avoidance intention in an online environment. Comparing to arousal emotion, pleasure demonstrates the strongest effect on approach/avoidance intention in the present study. Therefore, the design factors which produce higher pleasure should be embraced for the website design.



5. Conclusion

The present study examined the effect of website aesthetics on approach/avoidance intention. The results support that M-R model is a useful model to investigate the effects of environmental stimuli on approach/avoidance intention in an online environment. In this study, aesthetics of website is proved as an important design factor affecting emotional responses and approach/avoidance intention. In addition, the results also show that emotional states mediate the effect of website aesthetics on approach/avoidance intention. The design factors that induce higher pleasure or arousal produce higher approach intention. In addition, the findings also indicate that pleasure has the strongest effect on approach/avoidance intention.

For the aesthetics of website, classical aesthetics produces more pleasure compared to expressive and low aesthetics, and expressive aesthetics induces more pleasure than low aesthetics. On the other hand, expressive aesthetics produces higher arousal than classical and low aesthetics, and classical aesthetics induces more arousal than low aesthetics. The results seem to indicate that both classical and expressive aesthetics of websites would benefit on pleasure and arousal states and, furthermore, on approach/avoidance intention.

The findings imply that website aesthetics is an important factor that affects online consumers' emotional experience and approach/avoidance intention. Online store operators should follow the principles of classical and expressive aesthetic design of website (as suggested by Lavie and Tractinsky, 2004) in order to evoke desired emotional states and online behavior. Furthermore, comparing to arousal emotion, pleasure demonstrates the strongest effect on approach/avoidance intention in the present study. This gives a hint that the design factors which produce higher pleasure should be embraced for website design.

The present study investigated the effect of website aesthetics on online behavior. Some important limitations need to be noted. First, to control for the aesthetics of website, three different types of products were used for different aesthetic treatments. Because limited product types were used, researchers need to be careful when generalizing the results to other situations. A comprehensive investigation of the effect of website aesthetics on online behavior under different product types should be done in the future. Second, only one website of each of the three aesthetic categories was investigated in the present study. The application of the results needs to be cautious while limited websites were tested and more researches need to be done to draw a more robust conclusion. Finally, because the subjects were young students and recruited from a university campus in Taiwan,



highly homogeneous sample (college students) hinders the generalization of the results. In addition, because the participants were not actual shoppers of the websites, the participants may not have been interested in all or any of the websites presented and this is likely to influence results. Future research should include diverse participants to improve the generalization of the research results.

While emotional responses are holistic feelings that come from the integral perception of atmosphere of a store by all kinds of sensory modalities in the traditional retail setting, the emotional responses for the online context may be induced by combining stimuli of website aesthetics and background music that rely only on visual and acoustic sensation. Therefore, a direction of investigating the effect of combinative effect of website aesthetics and background music on emotional responses may be needed to fulfill the gap in the knowledge of online environmental atmosphere concerning the influence of music-induced pleasure and arousal on online behavior.

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