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The influence of user interface design on consumer perceptions: A cross-cultural comparison

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ABSTRACT

With more than 4 billion websites on the World Wide Web, it has become essential for companies, especially those who operate worldwide, to make their websites as appealing as possible for their customer base. This paper intended to provide some insight for companies who want to offer their products online to German and Taiwanese customers. A total of 703 valid responses from participants of both countries were collected in this study. The experimental result revealed significant effect of color and price on the customers' responses. The results also indicated that not only does color have a significant main effect on arousal, but that warm and cool colors influence Taiwanese and German participants to different degrees. Additionally, price resulted in a significantly high level of Perceived Usefulness and Pleasure. This paper can provide great insight to companies who wish to sell their products in one or both of these markets, which admittedly differ greatly from each other, by appropriate interface design of web pages.

1. Introduction

The proliferation of Internet and web technologies have resulted in the globalization, in which the companies can communicate and share information with their consumers without time and spatial limitations. Thus, more and more companies now sell their products through virtual stores. However, the culture differences have brought a significant challenge for companies operating their business in this globalization world. For example, the language, consumer behavior and preferences are different for people with different culture background and countries. Thus, one of the most critical issue for online retailers is to understand the culture differences across different countries (Chan & Tai, 2001) in order to design a website that is attractive to both potential and current customers (Kassim & Abdullah, 2010) and to develop appropriate online marketing strategies for their online business.

For retailers, atmosphere design has been found to have significant influence on consumers' emotional responses, which will in turn affect behavior (Baker, Grewal, & Levy, 1992). Studies were accumulated to address the effect of atmospheric design in physical retailing channels (Babin & Attaway, 2000; Donovan & Rossiter, 1982; Kotler, 1973; Kumar & Karande, 2000; Middlestandt, 1990; Spies, Hesse, & Loesch, 1997; Turley & Milliman, 2000), but limited attention was paid on the atmosphere issue online. Among a variety of ambient factors, color was one of the most important and effective stimulus to result in the change of consumer purchasing behavior (Bellizzi, Crowley, & Hasty, 1983; Bellizzi & Hite, 1992; Eskilson, 2002; Meyers-Levy & Peracchio, 1995; Middlestandt, 1990; Poast, 2000; Smith, 2008; Yildirim, Akalin-Baskaya, & Hidayetoglu, 2007). Not only the online store atmospheres studies are rare, but also the cross-cultural studies in this research stream gained limited attention.

According to the above-mentioned background, the objective of this study is to examine the influence of color on consumers' behavioral intention in online retailing context, taking culture difference into consideration. Specifically, this study aimed at learning more about the online buying behavior of Taiwanese and German consumers. The research questions raised by this study are: (1) will different interface design result in different consumer responses? (2) will different price level result in different consumer responses? (3) will nationality moderate the effect of interface and price on consumer responses?

2. Literature review

The framework of this study is based on the Stimulus-Organism-Response (S-O-R) model proposed by Mehrabian and Russell (1974). The S-O-R framework suggests that Stimuli affect customers' emotional states, which may further influence their response to the stimuli. The framework has been tested extensively in the online store context in the past (Dailey, 2004; McKinney, 2004; Menon & Kahn, 2002; Wu, Cheng,

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& Yen, 2008) and has proven itself to be a valid model in predicting consumer emotional responses. An example of behavioral responses effected by the emotional state are re-patronage, store search and in-store behavior (Thang & Tan, 2003).

Countless researchers have studied the effects of retail atmosphere on consumer behavior (Donovan and Rossiter 1982, 1994; Hussain & Ali, 2015; Lazaris, Vrechopoulos, & Doukidis, 2017; Spies et al., 1997). The results implied that the environmental cues of a retail environment have a significant effect on shoppers' behavior. Color, music, price and product presentation are just some of the many elements of Website Atmospherics that influence consumers' responses in online shopping. Current study focused on the effect of color and price in online retailing environment. The reasons are discussed as follows.

First, color has been suggested as one of the most important environmental stimuli as it is easy to be manipulated and effectively result in sensory, perceptual, cognitive and affective effects (Bellizzi & Hite, 1992; Meyers-Levy & Peracchio, 1995; Middlestandt, 1990; Poast, 2000; Sabrina, 2014). Accumulated studies was conducted to examine the effect of color on consumer responses mainly in physical environment (Bellizzi et al., 1983; Smith, 2008; Yildirim et al., 2007). However, limited studies were found to address the color influence in different cultures. Ou, Ronnier et al. (2012) is one of the studies that conducted the cross-cultural comparison of color effect. With the development of Internet, the online businesses are competing in globalized environment and thus the importance for understanding cultural differences are significant. Unfortunately, although some studies were addressing the culture issue for online businesses (Mazaheri, Richard, & Laroche, 2011; Richard & Habibi, 2016), the studies on color influence for online retailers that specifically address the cross-culture issue are rare. Further, price is another important stimulus in addition to color that will influence consumers' store preference and purchase decisions (Monroe, 1973; Seiders & Costley, 1994; Smith & Sinha, 2000). The impact of price on consumers' evaluation, store preferences, and purchase intentions had been discussed in prior studies (Dodds, Monroe, & Grewal, 1991; Leavitt, 1954; Monroe, 1976; Raghubir & Corfman, 1999; Smith & Sinha, 2000). However, the discussion regarding the influence of price in online retailing environment is limited. Thus, the impact of color and price and the combination of them as environmental stimuli in online retailing was considered in this study and related literature were reviewed as follows. Further, the cultural difference was believed to moderate the relationship between color, price and consumer perceptions. Thus, the discussion of culture issue was also provided in the following section.

2.1. Color

Color can be described in three different dimensions: color hue, saturation, and brightness (Munsell & Nickerson, 1940). Among them, color hue is the most popular dimension that describe the color as warm or cool colors according to the wavelength. Sort wavelengths are associated with "cool" colors, and blue is one of the example of "cool" colors. In another end of the spectrum, "warm" colors such as red is the color with long wavelength. Some studies suggested that the color red has a negative effect on the consumers buying behavior when in a physical store environment, while cool-colored store environments are much preferred by consumers (Bellizi, Crowley, & Hasty, 1983). Similar results were found in prior studies that consumers show more positive responses towards the store when they were exposed to cool color environment (Bellizzi & Hite, 1992; Brengman & Geuens, 2004; Meyers-Levy & Peracchio, 1995; Poast, 2000; Yildirim et al., 2007).

2.2. Price

According to Swani and Yoo (2010), product price is defined as the amount of money expected, required or given in payment for a particular product. Price is perceived as an important product quality cue (Bearden & Shrimp, 1982; Dodds et al., 1991). It has been found that not only does price influence the customers buying intention, but it also influences a business's sales margin (Azam, Zawawi, Abidin, Tan, & Sani, 2012; Bloch, 1995; Crilly, Moultrie, & Clarkson, 2004). In fact, price was found to play an important role in consumers' decision making processes. For example, price is the determinant of perceived quality of the product (Jacoby, Olson, & Haddock, 1971), Product/brand choice (Lattin & Bucklin, 1989) and evaluations (Dodds et al., 1991; Johnson, Herrmann, & Bauer, 1999; Munger & Grewal, 2001), perceived risk (Grewal, Gotlieb, & Marmorstein, 1994), customer loyalty (Martin, Ponder, & Lueg, 2009) and store preferences (Smith & Sinha, 2000).

2.3. Nationality and culture

A combination of developments in the past years, such as globalization and the emerge of information technology, has increased the need to understanding Web usage in different cultural and national settings (Huizingh, 2000; Rau & Liang, 2003; Robbins & Stylianou, 2003; Sakaguchi, Palvia, & Janz, 2001; Singh, Kumar, & Baack, 2005).

The four cultural dimensions were proposed by Hofstede (1991, p. 30) include specifically Power distance, Femininity and Masculinity, Uncertainty Avoidance and lastly Individualism and Collectivism, are one common way to differentiate between different cultures. The individualism refers to the extent to which the individual expects personal freedom. Collectivism on the other hand is defined by the acceptance of responsibility to family, tribal, or national groups – also in combination with a promise of loyalty (Soares, Farhangmehr, & Shoham, 2007). A study conducted in Saudi Arabia – which was by the researcher classified as a collectivistic culture – confirmed that Arabs are heavily reliant on dealing with family, tribe, clan or personal contacts in order to improve satisfaction and trust (Deresky, 2006, pp. 121–132). According to Hofstede and Bond (1988) Taiwan is a highly collectivistic culture, exhibits a very low level of individualism and a typical culture of group orientation. In contrast to that, Germany tends towards an individualistic culture, due to Germans urge to make their own decisions and their strong value for individual happiness.

Past studies have shown that cultural background can impact a variate of constructs. The effects of perceived ease of use and perceived usefulness from new technology seem to be restricted by cultural nuances such as low uncertainty avoidance, high masculinity, high power distance, and high collectivism (McCoy, Galletta, & King, 2006). Collectivist consumers are probably more tolerant and less demanding compared to the individualistic customers (Kassim & Abdullah, 2010). Ladhari (2008) found that constructs of service quality that are developed in one culture are not necessarily applicable to another culture. Also, Barber and Badre (1998) argue that the success of a global interface may only be achieved when the interface design reflects the cultural nuances of the target audience. They argue that 'Culturability', which puts Culture and Usability into a single entity, affects the degree of user friendliness of an interface. This includes background color, graphics, and spatial orientation. Chau, Cole, Massey, Montoya-Weiss, and O'Keefe (2002) empirically proved that negative and positive consumer reactions become more meaningful and predictable when a persons' cultural context is taken into account.

While most of prior studies suggested that people prefer cool color background than warm color in a store, an empirical experiment (Wu et al., 2008) conducted in Taiwan suggests that participants display higher levels of arousal and pleasure when exposed to websites with a red background color. The fact that the research conducted by Wu et al. (2008) had such a different result compared to previous studies might suggests that people in different cultures have different color preferences when it comes to website background colors. For example, in the Chinese culture red is a "happy" color, while it is by most western cultures perceived as an "aggressive" color. Further, some research that focuses on how cultural background influences consumers' reaction to

price cues concluded that consumers' values and norms vary cross cultural (Jin & Sternquist, 2003; Zhou & Nakamoto, 2001).

Due to the presented evidence we believe that a study of German and Taiwanese participants would shield significant differences, based of cultural characteristics. A total of ten measures are used to get a clear picture of the participants' ethnical and cultural background.

2.4. Online store perception

Web page appearance is one of the factors that a company must consider when trying to achieve customer satisfaction (Ho & Wu, 1999). The term Website Atmosphere is a visual allure which incorporates website's display attractiveness, aesthetic appeal, and general looking (Kim & Steol, 2003; Mathwick, Malhotra, & Rigdon, 2001; Muylle, Moenaert, & Despontin, 2004). The connection between store environment and customer's emotion responses, such as pleasure and arousal, have been empirically studied and confirmed (Babin, Darden, & Griffin, 1994; Baker et al., 1992; Sherman, Mathur, & Smith, 1997). Yoo, Park, and MacInnis (1998) discovered that, in the context of physical stores fronts, emotional responses are caused by the store environment. Dailey and Heath (1999), in which the research focuses on studying online store environments, found that Website Atmospherics do indeed influence shoppers' behavioral intention. Pleasant online store environment results in higher customer Pleasure and Arousal, leading to Approach Behavior toward the seller (Eroglu, Machleit, & Davis, 2003), and possibly also to a purchase. Past research also found a positive relation between website quality and shoppers' behavioral intensions (Lynch, Kent, & Srinivasan, 2002).

2.5. Perceived usefulness

Davis, Bagozzi, and Warshaw (1989) define Perceived Usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance". There is a broad range of existing research that confirms the linkage between Perceived Usefulness and Usage Intention (Agarwal & Prasad, 1999; Hu, Chau, Sheng, & Tam, 1999; Venkatesh, 2000; Venkatesh & Davis, 2000; Venkatesh & Morris, 2000). According to Mawhinney and Lederer (1990) Perceived Usefulness of the Information System is greatly related to customer satisfaction. When customers are exposed to an interactive shopping experience it was expected to result in perceived usefulness and ease of use of the website (Childers, Carr, Peck, & Carson, 2001). Since consumers are unlikely to use websites if they are not perceived as useful, this variable was added to the studies framework.

2.6. Trust

Trust was found to be a factor of essential importance by many analysts for the process of creating and preserving relationships with customers in an online service setting (Gummerus, Liljander, Pura, & Riel, 2004; Reichheld & Schefter, 2000; Ribbink, Riel, Liljander, & Streukens, 2004; Semejin, Riel, Birgelen, & Streukens, 2005). While it is believed that satisfied customers are more prone to trust the website than unsatisfied customers (Kassim & Abdullah, 2010), past research also acknowledges that Security and Reliability are two important hurdles to online shopping (Liao & Cheung, 2001; Rose, Evaristo, & Straub, 2003; Salkin, 1999). The number of new online users that have concerns about using their credit cards for online purchases is estimated to be around 80% (Miles, 2002). In response, a variety of companies have started to expand their tactics beyond focusing on Satisfaction to build Trust, with the intention of reducing consumers Perceived Risk of their service (Ranaweera & Prabhu, 2003).

2.7. Emotion

When shopping in a retail environment emotions created by the environment can be transferred into consumer satisfaction (Kuo & Wu, 2012). Under the influence of a favorable environment consumers will display a variety of more positive emotions (Isen, 1984). The consumer emotions play an important role as an intermediary factor when in the process of purchasing a product. Consumer's emotional responses are empirically proven to be induced by the store environment (Swani & Yoo, 2010; Yoo et al., 1998). Past research, conducted by Plutchik (1980) in the area of the Psycho-evolutionary Theory, proposed eight basic emotion categories, namely acceptance, fear, surprise, sadness, disgust, anger, expectancy and joy.

Many papers use the three dimensions Pleasure, Arousal and Dominance to measure reactions to environmental stimuli in a retail environment. Nevertheless, Russell (1979) as well as Eroglu, Machleit, and Davis (2001) propose that the two dimensions Pleasure and Arousal cover a wide range of emotional responses and may therefore be used exclusive of Dominance for retail consumer behavior studies.

3. Methodology

3.1. Research framework

The research framework was depicted in Fig. 1, which described 2 manipulated independent variables (color and price) and four dependent variables (online store perception, perceived usefulness, trust, and emotional responses). Moreover, culture difference was considered as a moderator that influences the relationships between color, price and the four dependent variables.

3.2. Experimental design and manipulations

A laboratory experiment was conducted to measure and explore this research's objectives. The experiment is a 3 (Color: warm/neutral/cool) × 2 (Price: high/low) between-subjects factorial design, which resulted in 6 different scenarios.

Past research has shown that watches are a suitable product to use for this kind of research (Dodds et al., 1991; Agarwal and Teas 2002). Further, the development of e-commerce also suggested that the watch industry is moving online (Amer, 2017; Swithinbank, 2015) and were therefore chosen to be the product offered in the current study. A fictitious experiment website was created using wix.com service, and a self-created brand name "WATCH WORLD" was created. The experiment website provided a variety of watches for both male and female. There are three color conditions: warm, neutral and cool colors. In the warm color condition, the red was selected for the background color of the website, while white background color was used for the neutral condition and blue color for cool color condition. All the stimulus remained the same across all the conditions except the background color.

Further, according to previous researchers (Agarwal and Teas 2002; Teas and Agarwal 2000) the price levels of US$50, US$175 and US$300 as low, average and high price were found to be adequate for the product wristwatches. This study therefore used the lowest and highest price levels as the manipulation of price levels. The price levels of high

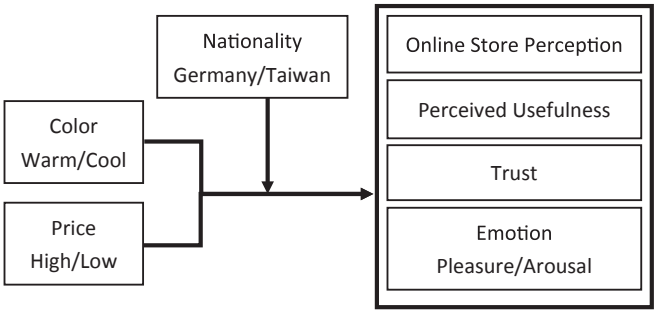

Fig. 1. Research framework.

and low were decided through a pre-test conducted in a previous study in Taiwan and confirmed with a manipulation check. After determining the high and low price, a range of + - 5% was evaluated in which the prices for the products on the website would vary. Even though the currency in which the prices were displaced was changed for the German sample, the order of the prices displayed on the experimental website and the price difference remained unchanged.

3.3. Procedures

Due to the fact that this research focusses on the German and Taiwanese market, online consumers from both countries were chosen to be the main participants. All participants that joined this study were randomly selected and given a questionnaire with a 3×2 design that contained a scenario corresponding to one of the six conditions Color (warm/cool/neutral) and Price (high/low). In all 6 scenarios the subjects were first shown an experimental website. After being exposed to the scenario, participants used a 7-point Likert scale to rate their reaction towards the website.

3.4. Measurements

A questionnaire was created using Google Forms. A 7-point Likert Scale was used throughout the whole study to evaluate the participant's reaction towards the questionnaire items. The questionnaire was formulated in English and then translated to Chinese and German. The Translations were then again back-translated to English to verify that they retained their original meaning after translation.

The current study used the measurement for Online Store Perception adopted from Kim, Fiore, and Lee (2006), which include 5 items to better understand the customers perception of the website. Further, the perceived usefulness was measured by the measurements developed by Deane, Podd, and Henderson (1998) and used by Henderson and Divett (2003). Trust was measured by 3 items which were adapted from Kim, Ferrin, and Rao (2008). Finally, consumers' emotional responses were measured by two dimensions- Pleasure and Arousal, adapted from Koo and Ju (2010).

4. Data analysis

4.1. Participants

A total of 731 participants joined this study. After review of all questionnaires, 703 responses (completion rate of 96%) were found to be valid and used for the following analysis. All participants for this research were students from major Universities in central and northern Taiwan, as well as northern Germany. All the participants were randomly selected to answer the questionnaire.

About 83 percent of the 703 participants were students and 259 were male, whereas 444 (63.16%) were female. About 94% of participants were aged 15 to 24 and about 16% were aged 25 to 34, as shown in Table 1.

Table 1
Demographics.

Characteristics	Germany	Taiwan	Total	Percentage
Gender				
Male	111	151	259	36.84%
Female	261	185	444	63.16%
Age				
15 - 24	259	326	589	83.78%
25 - 34	110	9	113	16.07%
35 and above	1	0	1	0.14%
Occupation				
Medical Professional	2	0	2	0.28%
Police and Military	5	0	5	0.71%
Education	10	1	11	1.56%
Labor/Worker	3	0	3	0.42%
Business	0	3	3	0.42%
Stay at Home Mom/Dad	1	0	1	0.14%
Self Employed	3	0	3	0.28%
Service Industry	2	1	3	0.56%
Student	330	329	659	93.74%
Agricultural Industry	2	0	2	0.28%
Currently Unemployed	2	0	2	0.28%
Other	9	0	9	1.28%
Nationality				
German	369	0	369	52.49%
Taiwanese	0	334	334	47.51%
Education Level				
High school	0	1	1	0.14%
Junior High School	0	27	27	3.84%
University/Bachelor	97	304	401	57.04%
Graduate school	26	2	28	3.97%
Lehre	1	0	1	0.14%
Hauptschule/Realschule	1	0	1	0.14%
Gymnasium/Abi	244	0	244	34.70%
Income per month				
< 10,000	72	292	364	51.77%
10,001–20,000	94	32	126	17.92%
20,001–30,000	117	8	125	17.78%
30,001–40,000	45	0	45	6.40%
40,001–50,000	21	2	23	3.27%
50,001–60,000	5	0	5	0.71%
> 60,001	15	0	15	2.13%

4.2. Manipulation check

A manipulation check was conducted to confirm that the price of high and low levels manipulated were perceived accordingly by participants. The participants were asked to fill out the questionnaire to indicate if they perceived two predetermined prices (NT$1600 and NT$9740, about US$50 and US$300 respectively) as low or high price levels. The results showed a significant difference in the participant's perception of the prices. We can therefore confirm that NT$1600 as the low and NT$9740 as the high price was appropriate for the Taiwanese version of this studies questionnaire.

In the German sample all participants were again asked to indicate if they perceived two predetermined prices (44 € and 270 €, about US$50 and US$300 respectively) as low or high. The results showed a significant difference ($p < 0.000$) in the participant's perception of the prices and thus the price level manipulation was successful.

4.3. Reliability and validity

To test the validity of the constructs used in this study, factor analysis was conducted for the items in each construct. Items with factor loading less than 0.7 were deleted. Results of the factor analysis showed that the validity of all the constructs is this study was achieved. Further, the Cronbach's alpha was assessed for the internal consistency of all the constructs and the results suggested that all the measures exhibited high reliability.

4.4. ANOVA

The descriptive statistics were provided in Table 2.

To learn more about the effect of environmental stimuli on our participants' responses in terms of store perception, perceived usefulness, trust, pleasure and arousal, five independent ANOVA tests were conducted.

Before conducting the ANOVA test, the assumption test on whether the variance homogeneity was violated. Thus, the variance homogeneity tests were conducted. The results indicated that the variance homogeneity assumption was achieved and thus the heterogeneity problem may not be fatal for the current study.

The results of ANOVA tests are visualized in Table 3. The results indicated significant main effect of Color on Store Perception, Trust and

Table 2
Descriptive statistics.

Independent variables		Means (S.D.)				
		Store Perception	Perceived Usefulness	Trust	Pleasure	Arousal
Color	Blue	3.722 (1.339)	3.643 (1.344)	3.807 (1.251)	4.029 (0.940)	3.258 (1.029)
	Red	3.652 (1.444)	3.492 (1.419)	3.600 (1.307)	4.016 (0.996)	3.812 (1.146)
	White	4.572 (1.289)	3.681 (1.351)	4.115 (1.187)	4.203 (0.989)	3.288 (1.150)
Price	High	3.901 (1.438)	3.470 (1.349)	3.830 (1.251)	3.980 (0.952)	3.476 (1.116)
	Low	4.039 (1.405)	3.732 (1.389)	3.832 (1.286)	4.180 (0.996)	3.456 (1.163)

Table 3
ANOVA analysis result.

	Store Perception	Perceived Usefulness	Trust	Pleasure	Arousal
Color (A)	33.193 ***	0.979	9.038 ***	2.513	18.237 ***
Price (B)	2.951	9.219 **	0.184	10.377 ***	0.344
Nationality (C)	20.529 ***	124.621 ***	17.390 ***	97.494 ***	2.152
A x B	3.280 *	3.016 *	0.132	0.689	0.828
A x C	12.665 ***	1.660	3.610 *	0.341	0.067
B x C	0.608	2.794	1.374	1.036	0.012
A x B x C	0.625	0.873	0.374	0.172	0.154

***p < 0.001, **p < 0.01, *p < 0.05.

Arousal. Price showed to have a significant main effect on Perceived Usefulness and Pleasure. Lastly, Nationality was found to have significant main effects on Online Store Perception, Perceived Usefulness, Trust as well as Pleasure. Further, a significant interaction effect of Color and Price on Online Store Perception and Perceived Usefulness was revealed. Significant interaction effect of Color and Nationality on Store Perception and Trust was also revealed.

The differences in different cell across scenarios were further illustrated in Table 4. The results suggested that the participants showed the highest level of store preferences and trust toward the store when they were exposed to white color background; while red is the most aroused color than blue and white. Table 4 also indicated that low price resulted in higher level of perceived usefulness and pleasure than high price. Further, Taiwan sample consistently show higher level of store preference, perceived usefulness, trust, and pleasure than German sample.

The detailed information of interaction effect is visualized in Tables 5 and 6. Table 5 showed the pairwise comparison results of color and price by using Scheffe. The analysis shows that white color consistently resulted in the highest level of store perception and trust across different price levels; while red is the color that cause the highest level of arousal.

In Table 5 the differences between the two Nationalities, Taiwan and Germany, were further examined. For both the Taiwanese and the German sample red resulted in a significantly higher level of arousal than blue. However, blue resulted in a significantly higher level of Trust in the German sample. For the Taiwanese sample we could not observe a significant difference between the colors on trust. In addition, both Taiwanese and German sample exhibited a significantly higher level of Online Store Perception when exposed to the color white than blue or red. This result seems to be corresponding to the literature which says that western cultures prefer cool colors like blue, while Asian countries prefer warm colors like red.

5. Discussion and conclusion

5.1. Main findings

Current study aimed at examining the effect of the online store user interface on customers' responses, as well as the moderating effect of nationality on this effect. The main findings based on experiment was summarized as follows:

First, different background color of red, blue and white resulted in significantly different consumers' responses in terms of store perception, trust and arousal. In general, white is the color that resulted in the most favorable responses, while the customers show the highest level of arousal when they were exposed to websites with red background color. The findings suggested that while white color served as control stimulus in the experiment, it is also one of the color options that the online store managers can consider. Further, the online store is suggested to be conscious in using red as the background color for webpages.

Second, the product price showed significant effect on the perceived usefulness and pleasure in which the participants are in favor of stores that provide low price than high price products. This result is consistent with the general concerns that online consumers seek discount or promotions and willingness to pay is lower online compared to that in physical store. Thus, the managers are encouraged to carefully design the pricing strategy when the products/services were offered online. Finally, Taiwan sample showed more positive responses toward the experimental website than German sample. Thus, more attention on website interface design might be needed to attract German consumers than Taiwan consumers.

Further, the interaction effect of price and color also revealed some interesting findings. For example, red as a background color had a higher influence on Arousal than blue regardless of price level. The result might indicate that when trying to sell products in an online environment it should be careful in choosing red as a background color over other colors combinations, especially in regards to inexpensive goods.

To get a better understanding about the differences by nationalities we will also have a look at the comparison by country. The results showed that in both Taiwan and Germany red exhibited a higher influence on Arousal. This might imply that there are no differences

Table 4
Post Hoc analysis of main effect.

	Level	Store Perception	Perceived Usefulness	Trust	Pleasure	Arousal
Color	Red	3.72 (1.34) [a]	3.49 (1.42)	3.60 (1.31) [a]	4.02 (1.00)	3.81 (1.15) [ac]
	Blue	3.65 (1.44) [a]	3.64 (1.34)	3.81 (1.25) [a]	4.03 (0.94)	3.26 (1.03) [b]
	White	4.57 (1.29) [b]	3.68 (1.35)	4.12 (1.19) [b]	4.20 (0.99)	3.29 (1.15) [bc]
Price	Low	4.04 (1.41)	3.73 (1.39)	3.83 (1.29)	4.18 (1.00)	3.46 (1.16)
	High	3.90 (1.44)	3.47 (1.35)	3.83 (1.25)	3.98 (0.95)	3.48 (1.12)
Nationality	Taiwan	4.23 (1.22)	4.16 (1.23)	4.05 (1.11)	4.44 (0.92)	3.39 (1.15)
	Germany	3.74 (1.55)	3.10 (1.31)	3.63 (1.37)	3.75 (0.91)	3.54 (1.13)

***p < 0.001, **p < 0.01, *p < 0.05.
[a]/[b]/[c] = indicate levels of significant difference.

Table 5
Pairwise comparison of price and color.

Price	Color	Store Perception	Perceived Usefulness	Trust	Pleasure	Arousal
High	Blue	3.80 (1.38) [a]	3.65 (1.33)	3.77 (1.19) [a b]	3.97 (0.91)	3.31 (0.99) [a]
	White	4.38 (1.39) [b]	3.49 (1.34)	4.07 (1.26) [b]	4.05 (1.05)	3.36 (1.16) [a]
	Red	3.53 (1.42) [c]	3.27 (1.36)	3.64 (1.26) [a]	3.92 (0.89)	3.75 (1.14) [b]
	F	11.556 ***	2.40	3.620 *	0.576	5.747 **
Low	Blue	3.64 (1.29) [a]	3.63 (1.37)	3.84 (1.31) [a b]	4.09 (0.97)	3.21 (1.07) [a]
	White	4.78 (1.14) [b]	3.88 (1.33)	4.16 (1.10) [b]	4.36 (0.89)	3.21 (1.13) [a]
	Red	3.76 (1.46) [a]	3.69 (1.45)	3.56 (1.35) [a]	4.10 (1.08)	3.86 (1.16) [b]
	F	25.095 ***	1.04	5.566 **	2.704	13.319 ***

***p < 0.001, **p < 0.01, *p < 0.05.
[a]/[b]/[c] = indicate levels of significant difference.

Table 6
Pairwise comparison of nationality.

Nationality	Color	Store Perception	Perceived Usefulness	Trust	Pleasure	Arousal
Taiwan	Blue	4.04 (1.27) [a]	4.09 (1.28)	4.04 (1.14)	4.37 (0.87)	3.17 (1.05) [a]
	White	4.46 (1.15) [b c]	4.19 (1.27)	4.14 (1.05)	4.52 (0.97)	3.25 (1.12) [a]
	Red	4.17 (1.22) [b c]	4.18 (1.19)	3.97 (1.14)	4.43 (0.94)	3.73 (1.19) [b]
	F	3.434 *	0.178	0.708	0.746	8.154 ***
Germany	Blue	3.43 (1.34) [a]	3.22 (1.26)	3.59 (1.31) [a]	3.71 (0.89)	3.33 (1.00) [a]
	White	4.68 (1.41) [b]	3.18 (1.29)	4.09 (1.31) [b]	3.89 (0.92)	3.33 (1.18) [a]
	Red	3.22 (1.48) [a]	2.92 (1.34)	3.19 (1.36) [c]	3.68 (0.91)	3.88 (1.11) [b]
	F	37.528 ***	2.030	11.241 ***	1.927	10.654 ***

Note: ***p < 0.001, **p < 0.01, *p < 0.05.
[a]/[b]/[c] = indicate levels of significant difference.

between nationalities when it comes to the effect of color on Arousal.

Furthermore, the result indicated that in the Taiwanese sample showed more favorable responses on color red than color blue; while the opposite was true for the German sample, where blue exhibited a higher preference. For example, German sample exhibited a higher level of trust toward the website with blue background color.

This result seems to be consistent with the outcome of previous studies who showed that Taiwanese participants exhibited more pleasant feelings when exposed to red background color (Wu et al., 2008). The same was true for the German sample, we expected blue to result in more pleasant feelings. Our assumption that color preference is influenced by a person's nationality might be confirmed by these results.

5.2. Implications

This paper provided important insights into the effect of online store interface design on consumers' responses. This study can contribute greatly to the academic and empirical understanding of the role of website atmospherics in online buying and provides knowledge about the differences in preference when it comes to consumers with different cultural background, specifically German and Taiwanese customers.

As we can see from the presented results, the German sample is more willing to trust a website when blue is used as a background color. However, no preference for a particular color could be found in the Taiwanese sample. We may therefore recommend Taiwanese companies who are interested into selling their products in the German market and want to create an online environment that German consumers perceive as trustworthy, to use blue as background color. As for the Taiwanese sample, it is believed that there are other variables than color that influence the consumers Trust towards a website. This is an important marketing implication, especially for companies interested in entering the Taiwan market.

Additionally, the research also showed that German consumers did indeed prefer a website environment with a blue background color. Taiwanese participants on the other hand preferred red as a background. This result is consistent with our Literature Review and might be explained by the fact that red in the Chinese culture is seen as a 'happy' and 'festive' color. Contrary to this, red is in many western cultures perceived as an alarming color that indicates the presents of danger. Blue on the contrary is perceived as a calming color because it reminds people of the ocean or the sky, objects that tend to have a calming effect on people.

In summary, the results provide important suggestions for businesses and their marketing strategies, especially in regard to those who are active or want to enter the German or Taiwanese market, and will help companies to greatly improve the quality of their website environment and a successful market entry.

5.3. Limitations and future research directions

The data collected in this study was from Taiwan and Germany samples. Future studies are suggested to make culture comparisons across more countries that covered more diversified culture background. Thus, more implications on the online store atmosphere effect can be derived across different cultures. Further, the manipulated variables in this study were limited to color and price, some other ambient factors such as web site design, navigation and background music are suggested to be included in future studies.

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