



## How does background music tempo work for online shopping?

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### ABSTRACT

This research examines the impact of background music tempo, an emotional stimulus, on consumer attitude in online shopping. The authors conducted two empirical studies based on the same experimental design. The results of both studies supported the study's main hypothesis: background music tempo positively affects consumer arousal. It also suggests that product category moderates the influence of arousal on pleasure such that a positive effect occurs when shopping online for hedonic products but not for utilitarian products. In addition, consumer trust mediates the positive influence of pleasure on purchase intention. The authors also discuss the managerial implications of the empirical results.

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### 1. Introduction

Online shopping has grown rapidly and gained broad acceptance. US online retail spending reached \$43.7 billion in the first quarter in 2011, up 17.6% from the same quarter a year ago. This growth rate represented the tenth consecutive quarter of positive year-on-year growth, except 2009 when the global financial crisis 2008–2009 hit consumer spending (US Census Bureau 2011). Meanwhile, more than 185 million Chinese went online to shop in 2010, representing an increase of 42.3%, from 130 million in 2009. China's online market was 140 billion yuan in 2008, 267 billion yuan in 2009, and it reached 498 billion yuan in 2010, when it accounted for 3.2% of China's total retail sales. China's online shopping market is expected to reach 890 billion yuan in 2011 (China IntelliConsulting Corp. 2011).

Because the online market is very competitive, it is difficult for marketers to seek or achieve price advantage; innovation has become the important strategy to gain competitive advantages. The online environment is different from the physical environment in that consumers search for product information and make purchase decisions in front of the screen. The environment at that moment becomes important because a pleasant atmosphere can induce positive emotions and enhance purchase intention. Background

music is one of the important means of creating a pleasant environment and should receive particular attention. Music is an invisible language that stimulates emotions and inner feelings and, therefore, consumer shopping behavior may be influenced by background music. Marketers often use background music matching the visuals to produce better advertising effects (Gorn et al. 1991; Macinnis and Park 1991). People stay for different durations of time and spend different amounts of money in supermarkets and restaurants under different background music environments (Milliman, 1982, 1986). People with low involvement are significantly affected by advertising music on TV (Park and Young 1986). Background music acts as an atmospheric cue that affects consumers.

The influence of environmental stimuli on people's responses based on environmental psychology theory has been empirically confirmed (Bellizzi and Hite 1992; Yalch and Spangenberg 1990). Environmental stimuli affect consumer emotional responses and, in turn, approach and avoidance behaviors. Positive effects of pleasure on shopping behavior have been well recognized. However, the effects of arousal have been found to be inconsistent; they may be positive, negative or even non-existent (Kaltcheva and Weitz 2006). Also, there may be factors having moderating effects on the process of emotional influence. How background music fits the shopping context and how it affects consumers' shopping behavior need further investigation. On the other hand, consumers perceive more risk under the online shopping environment because of the physical distance between buyers and sellers. Therefore, trust becomes more important in the virtual environment than in the physical environment (McCole 2002). The more trust

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customers have in an online store, the greater is the purchase intention. The mediating role of trust between pleasure and purchase intention is of interest.

The purpose of this research is to empirically examine the process of the influence of background music tempo on purchase intention in online shopping environment. Situations suitable for playing background music and the mediating role of trust are specifically addressed. Two empirical studies with the same experimental design were conducted to confirm the theoretical framework. The studies, implemented using two independent student samples, covered different sets of hedonic and utilitarian product categories. Managerial implications are discussed. The contribution of this research is to integrate the moderating role of product category and the mediating role of trust in the influence of background music tempo on purchase intention. Results of this research are expected to help marketers design online shopping environments.

## 2. Literature review and hypotheses

### 2.1. Environmental stimuli

Designs of store environments can affect shopping atmosphere and enhance the probability of purchase (Kotler 1973). Gorn (1982) discussed the influence of background music from a classical conditioning perspective. The simple association between a product (conditioned stimulus) and a stimulus such as music (unconditioned stimulus) can affect product preference. While people may have favorable attitudes toward products advertised in the context of unconditioned stimuli, these attitude shifts may simply be a function of mere exposure to advertised products. Classical conditioning suggests that a positive attitude toward an advertised product (conditioned stimulus) may develop through its association with other environmental stimuli (unconditioned stimulus).

This research uses the environmental psychology theory proposed by Mehrabian and Russell (1974): the M-R model. The model is operated in a stimulus-organism-response (S-O-R) framework and offers a description of environmental cues, mediating variables and relevant behaviors in the retailing context. According to the model, environmental stimuli affect consumers' emotional responses and emotion results in an approach or avoidance behavior. A positive emotion causes approach behavior while a negative emotion induces avoidance behavior. A positive emotion may contribute to extra shopping time and unplanned purchases. Stimuli influence people's responses in physical stores (Donovan and Rossiter 1982) as well as in online stores (Eroglu et al. 2003).

People may use their beliefs about servicescapes as surrogate indicators when forming beliefs about service quality (Bitner 1992). The effects of atmospheric cues on behavioral intention in online shopping are mediated by emotional states of consumers (Koo and Ju 2010). Music, sign, color, and light in stores can help produce good shopping atmosphere (Stevens 1980). If the environment in a store makes consumers feel comfortable and induces the feeling of joy when shopping, then their purchase intentions may rise. Because there are no sales persons or other customers in online shopping, the atmosphere plays an even more important role. Environmental stimuli are antecedents of intentional or unintentional behavior (Clitheroe et al. 1998). Background music is one of the important environmental or atmospheric factors (Donovan et al. 1994; Mehrabian and Russell 1974; Milliman 1982, 1986).

### 2.2. Effects of music on arousal

Cognitive processing is affected by environmental cues, such as music. Consumers infer product or service quality based on their feelings. Background music has been found to affect shopping atti-

tudes and behaviors (Sweeney and Wyber 2002; Yalch and Spangenberg 2000); its effects on consumers' preferences are subconscious (Gorn 1982). Music has been considered an efficient and effective means of nonverbal communication for triggering moods (Bruner 1990).

Distinct musical characteristics, such as tempo and timbre, have effects on emotion and attitude. Different kinds of music stimuli induce different emotions. Background music influences product perception (Zhu and Meyers-Levy 2005) and purchase behavior (Milliman 1982) through emotion. Pleasure is easy to induce with happy music (Alpert and Alpert 1988). Energetic music evokes excitement, whereas sedate music brings calm emotions and thoughts (Gabrielsson and Lundstrom 2001). Fast tempo music can induce higher arousal than slow tempo music (Day et al. 2009; Scherer and Oshinsky 1977; Sweeney and Wyber 2002; Zhu and Meyers-Levy 2005). Therefore, we hypothesize:

**Hypothesis 1** (*The Background Music Tempo Hypothesis*). Background music tempo has a positive influence on arousal of online shoppers.

### 2.3. Product category as a moderator

Background music influences online shoppers' emotions. Three dimensions of consumers' emotional responses have been identified: arousal, pleasure, and dominance (Mehrabian and Russell 1974). Attention has been focused on arousal and pleasure because those dimensions can explain most of the variance in purchase behavior (Donovan et al. 1994; Kaltcheva and Weitz 2006). Some researchers have argued that arousal and pleasure are independent dimensions (e.g., Russell and Pratt 1980). However, other scholars have indicated that arousal influences pleasure (e.g., Crowley 1993; Mano and Oliver 1993) and the influence can be either positive or negative, depending on the situation (Laroche et al. 2005; Kaltcheva and Weitz 2006). While pleasure is consistently positive in relation to shopping behavior, arousal is not. The impact of arousal varies across studies (Kaltcheva and Weitz 2006). Effects of arousal on approach behaviors may be positive (Sherman et al. 1997), negative (Milliman 1982), or non-existent (Sweeney and Wyber 2002).

Two types of consumer motivations, cognitive and affective, influence the process of product assessment (McGuire 1974). Two fundamental motivational orientations, task and recreational, lead to different arousal effects (Kaltcheva and Weitz 2006). Arousal effects decrease in case of consumers with a task-oriented motivation and increase in case of consumers with a recreational motivation. Utilitarian and self-value motivations initiate different involvements (Park and Young 1986). Utilitarian motivation corresponds to cognition and task, whereas hedonic or self-value motivation corresponds to affection and recreation. Utilitarian motivation causes cognitive involvement while hedonic motivation causes affective involvement. Consumers with cognitive involvement pay more attention to product argument. Consumers with affective involvement tend to express self-value and to be influenced by environmental stimuli to get pleasure. Consumers with different involvements have different attitudes (Park and Young 1986), which are the basic reasons of purchasing goods or services (Betra and Ahtola 1991). Product attributes are related to consumers' motivation and involvement. Products that are highly valued on the hedonic dimension rather than on the utilitarian dimension are easier to promote (Chandon et al. 2000). Hedonic products provide fun, pleasure, and excitement, and are defined as products whose consumption is primarily characterized by an affective experience (Dhar and Wertenbroch 2000). Utilitarian products primarily provide instrumental and functional value and are defined as products whose consumption is more cognition

driven, is goal-oriented and accomplishes a functional or practical task (Dhar and Wertenbroch 2000). Both hedonic and utilitarian products serve as inputs to sales promotion decisions.

Product types determined on the basis of cost, purchase frequency, value proposition, and degree of differentiation can moderate the relationships between consumer characteristics and attitudes toward online shopping (Lian and Lin 2008). It makes more sense to classify products in terms of hedonic or utilitarian characteristics because they are related to the emotional context. When shopping for hedonic products, consumers are interested in hedonic value, focusing on fun and playfulness. Potential entertainment and emotional values surpass the effect of achievement of any pre-specified end goal (Babin et al. 1994). Consumers find high-energy demand in high-arousal environments pleasant (Kaltcheva and Weitz 2006). When shopping for utilitarian products, consumers are interested in the utilitarian value of a product and are concerned with making their purchase efficient to achieve their goals with minimum irritation (Childers et al. 2001). Their focus is on completing the shopping activity efficiently and on obtaining the outcome with low energy. Fast and loud background music disrupts reading comprehension (Thompson et al. 2011). They do not feel the pleasure offered by high-arousal environments because they need to make more efforts to evaluate product information and complete their tasks under the interference of peripheral cues (Kaltcheva and Weitz 2006; Sanbonmatsu and Kardes 1988).

The usefulness of environmental stimuli for consumers depends on shopping situations. When shopping for hedonic goods, people tend to be biased toward having fun and playfulness (Petty and Wegener 1999). In a high-arousal environment, people feel more excited and enjoy shopping. The arousal context fits their needs in this situation. However, the same context may not be useful when shopping for utilitarian products because, under this situation, people tend to focus on assessing product information. The interactive effects between arousal and product category influence consumers' pleasure. Therefore, we predict:

**Hypothesis 2** (*The Product Category Hypothesis*). Product category moderates the influence of arousal on pleasure such that a positive effect occurs when shopping online for hedonic products but not for utilitarian products.

#### 2.4. Pleasure, trust, and purchase intention

As mentioned above, the M-R model can be used to interpret the mediating effect of consumers' emotion on the relationship between environmental stimuli and purchase behavior. This has been empirically verified (Sherman et al. 1997). Consumers' positive emotion in stores can induce approach behaviors. Customers are likely to buy more when they are in a happy mood. A positive mood can make consumers stay longer and spend more money in stores (Babin and Attaway 2000). Emotion is related to the decision-making process in consumption behavior (Gardner 1985). Consumers in a positive mood tend to feel relaxed and enjoy shopping. Approach behavior takes place when people experience a positive emotion, while avoidance behavior usually follows a negative emotion.

Neuropsychological studies have indicated that positive emotion leads the brain to release more dopamine, enhancing cognitive process efficiency. People in a happy mood are better able to access a rich and elaborately connected network of cognitively positive material (Isen 2001). Many trust decisions are made in affect-rich contexts, but the influence of emotions on trust has been largely ignored by prior research (Dunn and Schweitzer 2005). According to the affect-as-information model (Schwarz and Clore 1983, 1988) and the affect infusion model (Forgas 1995), pleasure is likely to lead to positive judgment (Dunn and Schweitzer 2005). People of-

ten unconsciously misattribute their affect to judgment and may perceive their momentary affective states as relevant information when making various kinds of judgments. The affect infusion model defines affect infusion as the process whereby affectively loaded information exerts an influence on the judgmental process. People are likely to make biased judgments in affect-rich contexts. Trust judgments can be influenced by affect (Williams 2001). Therefore, pleasure has positive effects on trust.

According to the commitment-trust theory of relationship marketing (Morgan and Hunt 1994), trust is one of the key factors in building and maintaining successful relationships. This theory has been re-examined, and trust has been reconfirmed as the key factor in online retailing (Mukherjee and Nath 2007). There is a higher perceived risk and uncertainty in online shopping (Forsythe and Shi 2003; Miyazaki and Fernandez 2001; van Noort et al. 2007; Yoon 2002), as customers are not able to have actual contact with sales persons or real products. Consumers often doubt the reliability of online stores and are less likely to buy if they perceive a higher risk (Lim 2003). Even after product information and familiarity with websites, the two important influential factors for online shopping (e.g., Hoffman and Novak 1996; Moe 2003; Schlosser 2003), have been well addressed, many consumers still hesitate to shop online. A lack of trust has been repeatedly identified as one of the formidable barriers to e-commerce (Wang and Emurian 2005). Because trust can reduce risk, people are more likely to purchase online if they perceive a higher degree of trust in e-commerce (Corbitt et al. 2003). Establishing an online environment trusted by customers is important for reducing uncertainties caused by distance and separation. Trust is a key influential factor for e-commerce (Reichheld and Scheffer 2000). Trust strength can be considered as the degree of purchase intention (Kennedy et al. 2001). Trust has a positive effect on purchase intention (Gefen et al. 2003; Schlosser et al. 2006) and on repeat purchase intention in online auctions (Chiu et al. 2010). Mahmood et al. (2004) conducted a cross-country empirical study covering 26 nations and found that trust significantly and positively affects online shopping behavior. In addition to perceived usefulness and the ease of use of technology, trust in the e-vendor should receive particular attention (Gefen et al. 2003; McKnight et al. 2002).

While perceived risk decreases purchase intention, a happy emotion can decrease perceived risk (Chaudhuri 2002; Moe 2003; Ma and Wang 2009) and increase purchase intention (Baker et al. 1992). Consumers who derive more pleasure from online environmental stimuli (e.g., background music), therefore, tend to have higher trust in the e-vendor, thus leading to a higher purchase intention. It is implied that consumers' trust in the e-vendor is an important mediator in the impact of pleasure on purchase intention. The direct effect of pleasure on purchase intention may still exist, after trust is included. Because pleasure has positive effects on trust (Dunn and Schweitzer 2005), a mechanism to increase pleasure through an online environmental design should be useful. We predict:

**Hypothesis 3** (*The Trust Mediation Hypothesis*). Trust mediates the positive influence of pleasure on purchase intention of online shoppers.

The research framework based on the above discussion is presented in Fig. 1.

### 3. Empirical studies

#### 3.1. Subjects and design

Four fictitious websites were developed to simulate the online shopping context, with each of the four combinations of back-

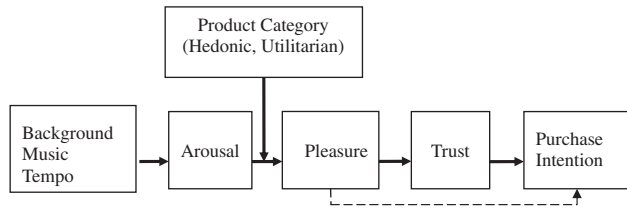


Fig. 1. Research framework.

ground music tempo (fast and slow) and product category (hedonic and utilitarian). As explained in later parts of this article, Allegretto and Sobani Iteyo were selected as the fast and slow music tempo, and video games and household electric appliances were selected in Study 1 while beer and health drinks were selected in Study 2 as hedonic and utilitarian products, respectively, for the experiments. Data were collected by questionnaires. A total of 75 undergraduate students participated in the Study 1 experiment, and another 87 undergraduate students participated in the Study 2 experiment. Product descriptions and other contents were adapted from existing websites. The subjects were randomly assigned to the four websites and the experiments were implemented in a computer classroom. Each subject was given a computer and was isolated from others so that he/she could complete the task independently.

To check the manipulation of product category and background music tempo, three straightforward questions were asked. The utilitarian versus not utilitarian and the hedonic versus not hedonic questions regarding products were measured on a seven-point semantic scale, whereas “the music tempo is fast” question was measured on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree).

### 3.2. Procedure

Participants were asked to shop online at the fictitious websites. The procedure was first described to them by one of the authors. Upon entering the websites, participants could see the product information and hear the background music, and then they considered what to buy. After a decision had been made, each participant was asked to complete a questionnaire. Upon completion of the experiment, the participant's contribution was gratefully acknowledged.

### 3.3. Independent variables

#### 3.3.1. Background music

Following Gorn (1982), Milliman (1982) and Wu et al. (2008), we considered a music tempo of 94 beats per minute (BPM) or more as fast and 72 or less as slow. The volume of the music played was uniform across fast and slow tempo conditions. Six songs with only instrumental music (three with a fast tempo and another three with a slow tempo) were selected for a pretest. Twenty-three subjects listened to the six songs in that pretest. Each song was played for about 1 min. After listening to a song, participants evaluated the song as fast or slow on a five-point semantic scale (fast to slow). The faster the music tempo was, the lower was the score. The song with the slowest tempo was Sobani Iteyo's (mean = 4.43), and the one with the fastest tempo was Allegretto (mean = 1.73). The mean tempo values were statistically significant ( $p < 0.01$ ). Therefore, Sobani Iteyo and Allegretto were selected as the two levels of the independent variable of background music tempo.

#### 3.3.2. Product categories

Voss et al. (2003) developed short scales for the hedonic and utilitarian dimensions of consumer attitude. To identify products

suitable for reflecting the hedonic and utilitarian attributes, another two pretests, one for Study 1 and the other for Study 2, by using Voss et al.'s (2003) scales, were conducted. In the pretest for Study 1, 29 subjects judged eight product categories (video games, MP3, household electric appliances, bicycles, computers, travel, DVD video recorders, and toys) based on the ten items in Voss et al.'s (2003) scales (five for each of the two dimensions) on the seven-point semantic scale. The more hedonic or utilitarian a product was, the lower was the score assigned by the participant. Reliability of measurements for the hedonic and utilitarian dimensions was satisfactory (coefficient alphas were 0.90 and 0.89, respectively). The category of video games had the smallest hedonic mean value, and the category of household electric appliances had the smallest utilitarian mean value. Mean values of hedonic attribute for video games and household electric appliances were 2.67 and 4.48, respectively, and were significantly different ( $p < 0.001$ ). Mean values of utilitarian attribute for video games and household electric appliances were 4.45 and 1.43, respectively, and were also significantly different ( $p < 0.001$ ). According to the pretest results, video games and household electric appliances were selected as hedonic and utilitarian products, respectively, in Study 1.

Study 2 used different product categories to further confirm the research framework. Six types of drinks (beer, health drinks, soft drinks, mineral water, juice and milk) were initially selected because the difference could solely be based on the product nature of being hedonic or utilitarian. To select the types of drinks that can well reflect the difference between hedonic and utilitarian nature, we conducted another pretest using another 37 subjects. Coefficient alphas for the hedonic and utilitarian dimensions were 0.8 and 0.9, respectively, implying acceptable reliability. Beer had the lowest score on the hedonic dimension, and health drinks had the lowest score on the utilitarian dimension. Mean values of the hedonic attribute for beer and health drinks were 2.17 and 4.6, respectively, and were significantly different ( $p < 0.001$ ). Mean values of the utilitarian attribute for beer and health drinks were 4.47 and 2.89, respectively, and were also significantly different ( $p < 0.001$ ). Thus, beer and health drinks were finally selected as hedonic and utilitarian products, respectively, in Study 2.

### 3.4. Dependent variables

The two studies used the same measures for the constructs of arousal, pleasure, trust, and purchase intention. Emotional responses toward online store were measured via the PAD (Pleasure, Arousal, Dominance) scale (Mehrabian and Russell 1974). There were six items for arousal measured on a seven-point semantic scale (excited to calm) and another six items for pleasure (pleasant to bored). The more the arousal or pleasure was, the higher was the score. Trust measures from Morgan and Hunt (1994) were applied. There were six items on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Purchase intention was measured with the scale from Dodds et al. (1991). There were two items on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree).

### 3.5. Control variables

The control variables were as follows: (1) having owned the product, Yes or No; (2) having the experience of buying the product, Yes or No; (3) having used the product, Yes or No; (4) having the experience of online shopping, Yes or No (Shim et al. 2001); (5) finding the background music suitable for the website, using the seven-point Likert scale; (6) liking the music or not, using the seven-point Likert scale (Caldwell and Hibbert 2002); and (7) defining their gender, Male or Female (Brown et al. 2003).



### 3.6. Results

#### 3.6.1. Manipulation checks of product category and background music

The last three questions (utilitarian/not utilitarian; hedonic/not hedonic; music tempo is fast) were asked to check the manipulation of product category and background music. In Study 1, the mean values of the utilitarian attribute for video games and household electric appliances were 4.07 and 2.40, respectively, which were significantly different ( $p < 0.001$ ). Those of the hedonic attribute for video games and household electric appliances were 3.11 and 4.03, respectively, also significantly different ( $p = 0.004$ ). Therefore, the manipulation of product categories was successful. The mean values of music tempo for fast and slow tempo groups were 4.97 and 2.82, respectively, and they were significantly different ( $p < 0.001$ ), thereby verifying the appropriateness of the music tempo manipulation.

Manipulation of product categories was checked successfully in Study 2. Mean values of the utilitarian attribute for beer and health drinks (3.75 and 2.81) were significantly different ( $p < 0.001$ ). Those of the hedonic attribute (2.70 and 3.94) were also significantly different ( $p < 0.001$ ). Moreover, mean values of fast and slow music tempo groups (5.47 and 2.52) were significantly different ( $p < 0.001$ ), indicating that the music tempo manipulation was appropriate.

#### 3.6.2. Reliability and validity

Confirmatory factor analysis (CFA) was used to assess reliability and validity of measurements for arousal, pleasure, trust, and purchase intention, based on the combined sample of Study 1 and Study 2 ( $n = 162$ ). Items with significant loadings on more than one construct were eliminated to achieve unidimensionality. The final results are reported in Table 1. The fit indices of  $\chi^2/df = 329.337/129 = 2.55$ , GFI = 0.83, NNFI = 0.89, CFI = 0.91, and RMSEA = 0.098 indicated that the CFA model fit was acceptable (Koo and Ju 2010).

Composite reliability coefficients ( $\geq 0.9$ ) and coefficient alphas ( $\geq 0.9$ ) were all satisfactory. The constructs and the associated items were all significantly related ( $t$ -values  $> 1.96$ ). Discriminant validity was assessed by comparing all pairwise squared correlations among the constructs against their respective average variances extracted (Koo and Ju 2010). As shown in Table 2, average variances extracted for any two constructs were greater than the square of their correlation. Therefore, discriminant validity was

supported. An alternative way of assessing discriminant validity is to examine if the confidence interval for the correlation between the two constructs does not include 1.0 (Anderson and Gerbing 1988). As none of the 95% confidence intervals for the construct correlations included 1.0, discriminant validity was established.

#### 3.6.3. Analysis – Study 1

A regression model, with a dummy variable defined for the two groups of online shoppers receiving fast and slow tempo music and the seven control variables, was used to test for the Background Music Tempo Hypothesis ( $H_1$ ) (the mean arousal for the former is higher than that for the latter). The results are shown in Table 3. It appears that the mean arousal for the fast tempo group was significantly higher than that for the slow tempo group at the 0.1 level (the estimate of the mean difference = 0.399,  $p = 0.08$  with the one-tailed test). Since the hypothesis is on the basis of theory and seven control variables are included to partial out their effects on arousal, a larger level of significance can be tolerated (Labowitz 1968). Background music tempo is shown to have a positive influence on arousal and thus  $H_1$  was supported.

Moderated regression analysis was used to test for the Product Category Hypothesis ( $H_2$ ) (product category moderates the influence of arousal on pleasure such that a positive effect occurs when shopping online for hedonic products but not for utilitarian products). A dummy variable  $D$  was introduced to represent two levels of product category, such that  $D = 0$  for hedonic products and  $D = 1$  for utilitarian products. The moderated regression model, including control variables, is given as follows:

$$\text{pleasure} = \beta_0 + \gamma_1 C_1 + \gamma_2 C_2 + \gamma_3 C_3 + \gamma_4 C_4 + \gamma_5 C_5 + \gamma_6 C_6 + \gamma_7 C_7 + \beta_1 \text{arousal} + \beta_2 D + \beta_3 \text{arousal} \times D + \varepsilon, \quad (1)$$

where  $C_1$ – $C_7$  represent the control variables mentioned earlier,  $\beta_3$  represents the interaction between arousal and product category, and  $\varepsilon$  denotes the error term. Examining the moderating effect of product category on the relationship between arousal and pleasure is equivalent to testing if  $\beta_3$  is zero.

Regression results are reported in Table 4. Because  $\hat{\beta}_3$  was statistically significant ( $\hat{\beta}_3 = -0.689, p < 0.001$ ), there existed the moderating effect of product category. The subsequent analysis indicated that the influence of arousal on pleasure was significant (slope = 0.808,  $p < 0.001$ ) for hedonic products like video games but insignificant (slope = 0.119 (=0.808 – 0.689),  $p = 0.195$ ) for

**Table 1**  
Confirmatory factory analysis results.

Construct	Item	Factor loading	t-value	Composite reliability	Coefficient alpha	Average variance extracted
Arousal	1	0.983	12.384	0.91	0.91	0.73
	2	0.877	12.243			
	3	1.050	14.463			
	4	1.013	13.593			
Pleasure	5	0.862	10.955	0.90	0.90	0.61
	6	0.823	10.333			
	7	0.938	12.905			
	8	0.896	13.459			
	9	0.853	11.950			
	10	0.731	9.498			
Trust	11	0.855	8.709	0.91	0.91	0.61
	12	0.901	11.871			
	13	0.858	10.391			
	14	0.892	13.550			
	15	0.934	13.595			
	16	0.959	14.279			
Purchase intention	17	1.114	15.070	0.94	0.94	0.89
	18	1.198	15.114			

Note: Model fit results:  $\chi^2/df = 329.337/129 = 2.55$ , GFI = 0.83, NNFI = 0.89, CFI = 0.91, RMSEA = 0.098.

**Table 2**  
Test for discriminant validity.

Construct	(1)	(2)	(3)	(4)
Arousal (1)	<b>0.73</b>			
Pleasure (2)	0.56 (0.062)	<b>0.61</b>		
Trust (3)	0.35 (0.076)	0.26 (0.080)	<b>0.61</b>	
Purchase intention (4)	0.33 (0.076)	0.26 (0.080)	0.68 (0.048)	<b>0.89</b>

Note: The figures that appear below the diagonal are correlation coefficients (standard errors). Average variances extracted are in boldface on the diagonal.

**Table 3**  
Results of regression for examining the effects of music tempo on arousal in Study 1 and Study 2.

	Study 1	Study 2
<i>Control variables</i>		
Having owned the product <sup>a</sup>	0.1465	-0.0126
Having the experience of buying the product <sup>a</sup>	-0.2673	-0.1065
Having used the product <sup>a</sup>	-0.3376	0.1275
Having the experience of online shopping <sup>a</sup>	0.1929	-0.0075
Degree of liking the music	-0.0031	-0.0465
Suitability of the background music	-0.2086	0.0302
Gender <sup>a</sup>	0.3354	-0.0640
Background music tempo <sup>a</sup>	0.3990 <sup>†</sup>	0.3019 <sup>†</sup>

<sup>a</sup> Dummy coded.

<sup>†</sup>  $p < 0.1$  (one-tailed test).

utilitarian products like household electric appliances. It appears that arousal has a positive effect on pleasure for hedonic products but not for utilitarian products. Therefore, H<sub>2</sub> was supported.

The following three regression models were used to examine the Trust Mediation Hypothesis (H<sub>3</sub>) (trust mediates the positive influence of pleasure on purchase intention of online shoppers), after controlling for C<sub>1</sub>–C<sub>7</sub>:

$$\text{purchase intention} = \beta_{20} + \gamma_{21}C_1 + \gamma_{22}C_2 + \gamma_{23}C_3 + \gamma_{24}C_4 + \gamma_{25}C_5 + \gamma_{26}C_6 + \gamma_{27}C_7 + \beta_{21}\text{pleasure} + \varepsilon_2, \quad (2)$$

$$\text{trust} = \beta_{30} + \gamma_{31}C_1 + \gamma_{32}C_2 + \gamma_{33}C_3 + \gamma_{34}C_4 + \gamma_{35}C_5 + \gamma_{36}C_6 + \gamma_{37}C_7 + \beta_{31}\text{pleasure} + \varepsilon_3, \quad (3)$$

$$\text{purchase intention} = \beta_{40} + \gamma_{41}C_1 + \gamma_{42}C_2 + \gamma_{43}C_3 + \gamma_{44}C_4 + \gamma_{45}C_5 + \gamma_{46}C_6 + \gamma_{47}C_7 + \beta_{41}\text{pleasure} + \beta_{42}\text{trust} + \varepsilon_4. \quad (4)$$

**Table 4**  
Results of regression for examining moderation and mediation effects in Study 1.

	Pleasure	Trust	Purchase intention	Purchase intention
<i>Control variables</i>				
Having owned the product <sup>a</sup>	-0.093	0.349	0.236	-0.019
Having the experience of buying the product <sup>a</sup>	-0.096	0.108	0.054	-0.025
Having used the product <sup>a</sup>	0.091	-0.010	-0.165	-0.157
Having the experience of online shopping <sup>a</sup>	-0.179	-0.102	-0.435	-0.361
Degree of liking the music	0.130	0.047	0.072	0.038
Suitability of the background music	-0.205	-0.130	-0.041	0.054
Gender <sup>a</sup>	0.072	0.326	0.036	-0.202
Arousal	0.808 <sup>***</sup>			
Product category <sup>a</sup>	3.292 <sup>***</sup>			
Arousal × product category <sup>a</sup>	-0.689 <sup>***</sup>			
Pleasure		0.253 <sup>*</sup>	0.432 <sup>**</sup>	0.247 <sup>*</sup>
Trust				0.729 <sup>***</sup>

<sup>a</sup> Dummy coded.

<sup>\*</sup>  $p < 0.05$ .

<sup>\*\*</sup>  $p < 0.01$ .

<sup>\*\*\*</sup>  $p < 0.001$  (one-tailed tests for examining the mediation effects).

The regression results are also reported in Table 4. H<sub>3</sub> was supported as the positive effect of pleasure on purchase intention was significant ( $\hat{\beta}_{21} = 0.432, p = 0.002$ ); the effect became smaller but still significant ( $\hat{\beta}_{41} = 0.247, p = 0.027$ ) after trust was included. In addition, pleasure had a significant positive effect on trust ( $\hat{\beta}_{31} = 0.253, p = 0.014$ ), and trust had a significant positive effect on purchase intention ( $\hat{\beta}_{42} = 0.729, p < 0.001$ ), controlling for pleasure. The influence of pleasure on purchase intention was found to be partially mediated by trust.

### 3.6.4. Analysis – Study 2

Mean difference between arousal in fast and slow tempo groups, given the control variables, was significant at the 0.1 level (estimated difference = 0.3019,  $p = 0.094$ , see also Table 3). The Background Music Tempo Hypothesis (H<sub>1</sub>) was thus supported. Background music tempo has a positive influence on the arousal of online shoppers.

Results of the moderated regression analysis are reported in Table 5.  $\hat{\beta}_3$  was significant ( $\hat{\beta}_3 = -0.358, p = 0.044$ ), showing the moderating effect of product category. Further analysis indicated that the influence of arousal on pleasure was significant (slope = 0.507,  $p < 0.001$ ) for hedonic products like beer, but insignificant for utilitarian products like health drinks (slope = 0.149 (=0.507 – 0.358),  $p = 0.158$ ). The conclusion is the same as in Study 1. Arousal has a positive influence on pleasure for hedonic products but not for utilitarian products. The Product Hypothesis (H<sub>2</sub>) was thus supported.

An analysis similar to that in Study 1 was performed to test for the hypothesized mediation effect of trust. The results are also presented in Table 5. Pleasure had a significant positive effect on purchase intention ( $\hat{\beta}_{21} = 0.288, p = 0.034$ ) when trust was not included in the model, but not when trust was included ( $\hat{\beta}_{41} = 0.051, p = 0.352$ ). Moreover, pleasure was found to have a significant positive effect on trust ( $\hat{\beta}_{31} = 0.322, p = 0.005$ ), and the influence of trust on purchase intention was significant ( $\hat{\beta}_{42} = 0.735, p < 0.001$ ). Therefore, trust completely mediated the positive influence of pleasure on purchase intention. H<sub>3</sub> was thus supported.

In conclusion, all the three hypotheses were empirically supported by both studies.

## 4. Discussion

The two empirical studies provide consistent support for the hypotheses. Fast tempo background music can lead to higher arousal than slow tempo background music. The music stimuli

**Table 5**  
Results of regression for examining moderation and mediation effects in Study 2.

	Pleasure	Trust	Purchase intention	Purchase intention
<i>Control variables</i>				
Having owned the product <sup>a</sup>	−0.030	−0.110	−0.070	0.011
Having the experience of buying the product <sup>a</sup>	0.193	0.556	0.684	0.275
Having used the product <sup>a</sup>	−0.102	−0.567	−0.564	−0.147
Having the experience of online shopping <sup>a</sup>	0.290	0.229	0.283	0.114
Degree of liking the music	0.103	0.169	0.135	0.011
Suitability of the background music	−0.036	0.026	0.086	0.067
Gender <sup>a</sup>	−0.201	−0.083	−0.398	−0.338
Arousal	0.507***			
Product category <sup>a</sup>	1.343*			
Arousal × product category <sup>a</sup>	−0.358*			
Pleasure		0.322**	0.288*	0.051
Trust				0.735***

<sup>a</sup> Dummy coded.

\*  $p < 0.05$ .

\*\*  $p < 0.01$ .

\*\*\*  $p < 0.001$  (one-tailed tests for examining the mediation effects).

influence consumers' affective responses in the online environment. Product category moderates the effect of arousal on pleasure in such a way that the positive influence is significant in the case of hedonic products only. Therefore, arousal has no significant effects on online shopping behavior for utilitarian products. In addition, the positive influence of pleasure on purchase intention is mediated by trust. Our findings are consistent with those of [Kaltcheva and Weitz \(2006\)](#), which indicated that recreation-oriented shoppers prefer a more exciting atmosphere, whereas task-oriented shoppers prefer simpler merchandise presentations. The results have empirically demonstrated the extent to which background music can work; it creates a high-arousal environment to first enhance pleasure and then purchase intention, but is helpful for hedonic products only. Background music tempo has no impact on purchase intention for utilitarian products because it may actually impede the evaluation of product information. Background music is, therefore, not recommended for utilitarian products.

#### 4.1. Theoretical contribution

Prior research has mostly applied the S-O-R framework to examine the effects of background music on approach behavior through the mediation of emotion. In this study, we have added product category (hedonic versus utilitarian) as a moderator and trust as a mediator to help clarify how background music influences online shopping. The empirical results provide interesting insights. Trust does mediate the influence of pleasure on purchase intention. Background music tempo has an effect on hedonic but not utilitarian products.

The first theoretical contribution of this study is to offer a new direction for designs of online shopping environments. When creating an affect-rich context by adding background music, product attributes should be taken into account. Not considering product attributes is one of the reasons why creation of the arousal emotion has been found to have inconsistent effects on purchase intention in prior research. For example, [Sherman et al. \(1997\)](#) and [Donovan and Rossiter \(1982\)](#) found a positive effect of arousal on purchase intention while [Milliman \(1982\)](#) found a negative effect. Considering background music tempo and product attributes together can demonstrate the effect of stimuli more specifically. Fast tempo music is positively related to pleasure, but only for hedonic products.

The second theoretical contribution of this study is to indicate that trust mediates the relationship between pleasure and purchase intention in online shopping. Trust can be increased by plea-

sure in affect-rich contexts because pleasure leads to positive judgment. Increased trust helps reduce consumers' perceived risk and encourages positive buying decisions. The mediation role of trust to explain the influence of pleasure on purchase intention in online stores has rarely been discussed in previous research. It has been empirically confirmed in this study.

#### 4.2. Practical contribution

Some important practical implications are noteworthy. Instead of using the price-based competition strategy, online marketers should pay more attention to the design of online shopping environments. They should focus on creating environments that fit the shopping situation. They may find the effect of background music particularly useful as it is relatively inexpensive to design, create and control the desired environment.

Before selecting background music, online marketers should consider their product attributes. Fast tempo background music is recommended for hedonic products. Arousal caused by fast tempo music can increase pleasure and then enhance the value perceived by the consumers. A high-arousal environment is suitable in this situation. Other means like website designs with saturated colors, such as intense orange and red ([Kaltcheva and Weitz 2006](#)), can be used in conjunction with background music tempo to trigger further arousal. However, the strategy of using fast tempo background music does not work for utilitarian products. Consumers may not feel comfortable because they need to make more efforts to evaluate product information under a high-arousal environment. Marketers should focus on knowledge characteristics such as specialization, preciseness, and diversity, and system characteristics such as interactivity, responsiveness, and communication richness ([Koo and Choi 2010](#)). Hedonic and utilitarian products should be placed separately on different web pages to attain better effects.

Pleasure leads to online shopping intention because trust is heightened by pleasure. A suitable atmosphere can enhance pleasure. Consumers will be more favorably disposed toward products when they are in a good mood ([Gardner 1985](#)). Fast background music tempo is recommended for hedonic products only; for utilitarian products, pleasure may be increased by a simple merchandise layout, coupled with a highlighted introduction ([Kaltcheva and Weitz 2006](#)). There are ways to increase trust. The perceived ease of use of websites should be improved ([Gefen et al. 2003](#)). Consumers usually pay attention to assurance, policies, guarantees and security mechanisms on a vendor's website ([Chau et al. 2007](#)).

These features influence consumers' trust in websites positively (Martín and Camarero 2008). Trust may also be strengthened through a guarantee of the quality of the products sold. On-time delivery can also lead to a higher level of trust. As consumers feel safer, their decision to buy becomes easier to make. Maintaining consumers' trust is likely to lead to good word-of-mouth and heighten intention to buy a product in the future.

In conclusion, an effective strategy to increase consumers' purchase intention for hedonic products in online stores is to use fast tempo music, coupled with ways to increase trust.

#### 4.3. Limitations and directions for further research

This study offers explanations for some important aspects of online shopping. While guidelines have been provided for creating effective online shopping environments and increasing consumers' trust, there are limitations to this study. First, only two product categories were used as representatives of hedonic products and two others for utilitarian products. More products of each type could be used in future studies to further confirm our conclusion. Secondly, the two experiments in this study were conducted on fictitious websites. Similar experimental research using real online stores would further increase the validity of the results. Finally, only the background music and the product categories were considered. Addressing other relevant factors such as design cues (Baker 1987), social cues (Wang et al. 2007) and different product attributes simultaneously deserves more research in the future.

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