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The Influence of Background Music Popularity on Consumer Online Shopping Behavior: A Model Analysis

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ABSTRACT

This study investigates the impact of music popularity on online shopping behavior and emotion regulation. Thirty participants with online shopping experience engaged in simulated e-commerce browsing sessions for sports shoes while exposed to no music, non-pop, or pop music. Objective data, collected through eye tracking, and subjective evaluations via questionnaires and semi-structured interviews were analyzed. Results reveal a significant increase in shopping duration with music, particularly with pop music, which elicited heightened emotional arousal and increased engagement, such as adding items to carts and sharing selections. Pop music, being more familiar, enhanced attention and desire to purchase. These findings underscore the strategic importance of using background music in e-commerce to create a favorable auditory environment and influence consumer behavior. Understanding how music influences mood regulation can guide businesses in optimizing their marketing strategies to enhance the online shopping experience and promote product consumption effectively.

Keywords: Consumer behavior, Shopping experience, Music popularity, Auditory marketing

INTRODUCTION

With the popularity of online shopping, online e-commerce pays more and more attention to the influence of sensory marketing on consumer behavior. Consumer attitudes are also different than they used to be. What consumers buy is no longer the product itself, but also the various sensory stimuli and experiences in the consumption process (Li et al., 2023). Among the human senses, hearing is the second most important source of information acquisition after vision. Previous research has shown that music plays an important role in enhancing consumers' online shopping experience. More recently there has been increased commercial interest in sonic branding, a move from the 'visual turn' to the 'sonic turn' (Khamis & Keogh, 2023). However, the specific patterns of music-induced consumer impulses have not been fully discovered. Therefore, this study aims to explore the influence of music popularity on online shopping behavior. The results of the study can create a better auditory environment for users' shopping experience, and can also guide merchants to choose music that suits their brand positioning.

RELATED LITERATURE

The purpose of this study is to explore the influence of music popularity on online shopping behavior, which requires in-depth research and understanding of the mechanism and practice of music to promote consumption. This part mainly starts with the theory and development of music to promote consumption, and explores and analyzes the relevant literature. Through understanding the practical application of music in the online shopping scene, the subsequent experimental design and development will be guided.

The Mechanism of Music Promoting Consumption

The shopping atmosphere is established by a variety of sensory elements. Such as visual layout, auditory music, olfactory odor and so on. And the above features can be explained by Mehrabian and Russell's Stimulus-Organism-Response (SOR) model.The SOR model is a commonly used model in the field of psychology and consumer behavior. This model has been used to study the influence of store environment factors on Chinese consumers' sentiment and intention to purchase luxury brands. The results show that listening to music can make customers feel excited and happy while shopping for luxury goods (Yang et al., 2022).

Other studies show that many Organism regions are found to be involved in regulating emotion. For example, music can independently influence flavor evaluation and gustatory experience by eliciting emotions (Lin et al., 2024). And fast music is more effective than slow music for evoking positive taste expectations and purchase intentions (Pantoja & Borges, 2021). Emotional value also played a mediating role in the relationship Between attitudes toward store music and customer loyalty (Meng & Yang, 2022). This is a trend of contemporary brand owners in sensory marketing, that is, from a single behavioral induction transition to produce an image binding with the product itself. Just as music increasing the salience of valued product attributes (Flynn et al., 2022). This building of loyalty and trust is conducive to the expression of the brand through sound, namely sonic branding. Beyond that, the mere presence of music decreases consumers' liking of complex visuals (Klein et al., 2021). This serves as a guide for the subsequent construction of the audition combination for shopping scenes.

Music Material Selection

For the selection of audio material, many previous studies have represented different emotional pointers through macro music genres. The experiment of taste preference by jazz, classical, rock and hip hop music genres proves that different genres of music lead to different taste preferences (Motoki et al., 2022). Alternatively, existing songs were selected based on different beats. Another study looked at consumers' memory retention in advertisements using four electronic dance songs played to different beats (Johnson et al., 2021).

However, with the development of time, the selection of music is not homogenized. Many studies have begun to self-adjust the parameters of the audio itself to control the independent variable. They may have acquired material from existing music platforms and later altered emotional pleasure by controlling the variables to ensure that arousal and tempo were the same

(Chang & Kim, 2022). In addition to this, there are many researchers who create their own audio via MIDI to meet the requirements of their experiments. However, a better way to study the popularity of music is to categorize and define existing music through pre-experimentation. For example, the user's subjective rating of music as "enjoyable, appropriate, or annoying" (Xu & Yang, 2023). This composed soundtracks approach with strategically chosen soundscapes reduces the definitional bias caused by the researcher's subjectivity (Peng-Li et al., 2021).

Application Scenario of Music in Online Shopping

Previous research has focused more on the role of music as a marketing aid in brick-and-mortar stores. However, a growing body of research suggests that brands favor music to achieve longer-lasting impression-enhancing effects. There has been research around how brands can leverage the characteristics of music pieces to convey an innovative image and boost brand evaluations among consumers (Zoghaib et al., 2023). Thus the online shopping consumption scenario would be more compatible with this trend, as it is less exposed to other environmental distractions. The musical experience of online shopping also varies according to the consumer's purposeful orientation. Crossmodally incongruent background music (vs. no music) leads to more positive consumer reactions for experiential browsers and more negative consumer reactions for goal-directed searchers (Doucé et al., 2022). In addition to this, studies in the advertising category are more frequent. Resolving mild musical incongruity may enhance consumers' attitude toward advertising, perception of brand image and quality, as well as their purchase intent (Abolhasani & Golrokhi, 2021). Typically, there is a video pilot on the product display page. This part of the advertising content has been widely used in online shopping scenarios. In addition, the interaction between music and consumers also enhances the online shopping experience. Interactive music enhances the experiential value of e-commerce for low-involvement consumers (Hwang et al., 2020). This is harder to realize in offline shopping scenarios. Therefore, it can also be seen that the scene of music consumption is gradually shifting from offline to online.

METHOD

Music Scoring Experiment

In order to make the music materials selected for the experiment more in line with the subjective perception of the participants in terms of popularity, we conducted a music scoring experiment before the main experiment. In this experiment, we first selected 50 popular songs and 50 non-pop songs based on the chart ranking of each music platform. Then 10 participants were invited in each of the two groups to conduct the rating experiment. During the experiment, the participants were asked to open the playback page of the 50 songs and listen to the songs in turn. After listening to the songs, they were asked to think about the appropriateness of using the music for the purchase of the product on the side of the display. The process took about 50 minutes in total. Based on the experimental results, we came up with the top 10 songs in the popular group versus the bottom 10 songs in the non-pop group. The results will be used in subsequent experiments.

Participant

We recruited 30 users with many years of online shopping experience. Among them, there was an equal gender ratio of men and women, as this allowed the influence of the gender factor to be ignored. Participants ranged in age from 19 to 33 years ($M = 23.8$, $SD = 3.2$), which is the largest age group in the online shopping population. All participants had no medical conditions affecting their eyes or hearing, had normal music perception and expression, and were able to understand the researcher's instructions and express themselves. Participants were randomly and equally divided into three groups to participate in the online shopping operation of the no music group, the no pop music group and the pop music group respectively.

Procedure

First, the whole experimental process was explained by the experimenter, and then the participants were asked to fill in the personal information and informed consent form. Second, the researcher adjusted the equipment according to the different participants' own conditions. The experiment was conducted indoors, and the participants chose to sit in a natural and comfortable position without the use of clamps, and the seat was soft and stable. There was no noise or human interference throughout the experiment. In our experimental scenario, the subject needs to put their head on the head rest, and the experimenter will adjust the eye movement system. After the adjustment, there will be a test interface similar to the experimental content to ensure that the participants understand the purpose of the experiment.

We simulated the current mainstream e-commerce shopping website to create an online shopping page for sneakers. At the beginning of the experiment, participants will browse the interfaces of a total of 8 pairs of couples' sneakers. Eye-focusing was performed before browsing each interface to ensure accurate eye-movement information acquisition. A questionnaire was administered after each interface was browsed. The participants were mainly questioned about their willingness to collect, willingness to add to the shopping cart, pleasure and control. During the experiment, the experimenter will play the corresponding music according to the type of participants. We considered that the playing order of the songs might have an effect on the participants' emotions. Therefore the song playing within the group was not randomized, but each experimental group was randomized. The experiment was set up with two experimental groups and one control group. The control group did it without music. The experimental group completed the interface browsing under the background of popular music and unpopular music respectively.

At the end of the experiment, the participants need to conduct an interview, the interview content is mainly to understand the subject's recall degree of the product, and synthesize the results of the questionnaire to determine the subject's willingness to buy. At the same time, the experimenter needs to record the results of the experiment data, mainly eye movement heat map, eye movement trajectory map and page dwell time, through these data can determine the subject's point of interest, compared with the questionnaire interview is more objective.

RESULTS

In order to balance the subjectivity and objectivity of the experimental results, this section describes the results from the following three perspectives: (1) participants' purchase intention and emotion assessment; (2) eye movement data; and (3) interview findings.

Purchase Intention and Emotion Assessment of Participants

In terms of participants' willingness to buy, we recorded the ratio of four behaviors (CART, BUY, SHARE, COLLECT) of the participants in different music environments. In addition, the participants' emotional states before and after the experiment were counted based on a 9-point Likert scale. The main dimensions of emotional assessment were pleasure, arousal and dominance.

Based on the experimental results, we conducted a t-test to observe the differences between the different experimental groups (see Table 1). We observed that in the experimental group no music-with music (non-popular), there was no significant change in both purchase behavior and mood. In contrast, compared to non-pop music, the participants' CART ($t=-2.106$, $p = 0.027$) versus SHARE ($t=-2.621$, $p = 0.01$) ratio in the shopping situation of listening to pop music) ratios are significantly increased. In the non-pop music shopping scenario, the mean value of the ratio of participants' CART for the item was about 0.1875, while it increased to 0.375 in the pop music scenario. The effect on SHARE behavior was even more pronounced. Only one subject performed this behavior in the non-pop music scenario. In contrast, the commodity sharing ratio increased to 0.159 under pop music (see Figure 1). In addition, pop music showed a significant increase in arousal in mood. It can be seen that pop music has a certain effect on the pleasure, arousal and dominance of emotions (see Figure 2). Among them, the effect of arousal is the most significant.

Table 1. T-test results of experimental data.

Data content	No music-with music		Non pop-pop	
Add shopping cart ratio	$t=-0.742$, $p = 0.235$		$t=-2.106$, $p = 0.027$	
Immediate purchase ratio	$t = 1.368$, $p = 0.096$		$t = 0.067$, $p = 0.474$	
Add to favorites ratio	$t = 1.336$, $p = 0.102$		$t=-1.594$, $p = 0.067$	
Commodity sharing ratio	$t=-0.449$, $p = 0.33$		$t=-2.621$, $p = 0.01$	
User emotional pleasure	$t = 1.655$, $p = 0.058$	$t=-0.113$, $p = 0.455$	$t = 0.314$, $p = 0.379$	$t=-0.467$, $p = 0.323$
User emotional arousal	$t=-0.978$, $p = 0.171$	$t=-1.581$, $p = 0.061$	$t=-0.289$, $p = 0.388$	$t=-1.955$, $p = 0.032$
User emotional control	$t=-0.432$, $p = 0.335$	$t=-1.035$, $p = 0.153$	$t=-0.622$, $p = 0.271$	$t=-0.845$, $p = 0.204$

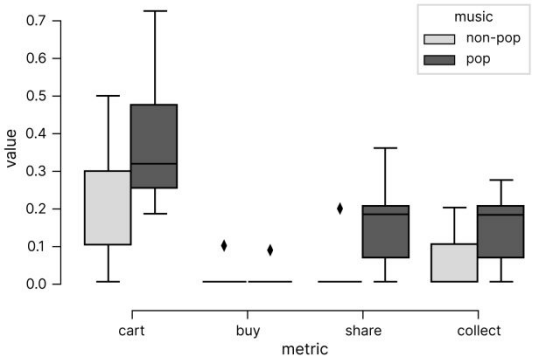

Figure 1: Non-pop - pop music shopping behavior results data distribution.

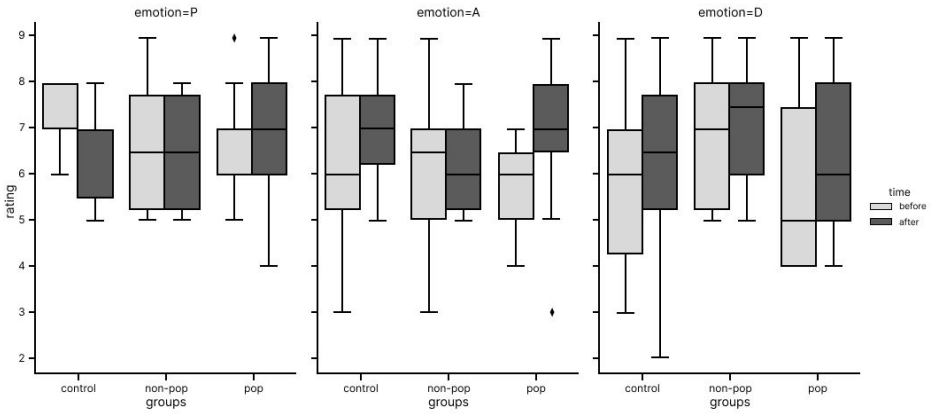

Figure 2: The data distribution of emotional scores of participants in three groups of music environment.

However, it is undeniable that the presence of non-pop music still has a certain effect on the pleasantness and arousal of shopping mood. We speculate that the presence of music, regardless of its popularity, creates a pleasant atmosphere for shopping. The decrease in arousal may be due to the fact that non-pop music does not create a sense of familiarity in the participants, and therefore the participants are not excited, but rather their attention is somewhat distracted.

Eye-Tracking Data

By recording the participants' shopping browsing duration, it can be clearly observed that the intervention of music prolonged the participants' page dwell time ($t=-2.280$, $p = 0.019$). And the effect of pop music is more significant compared to non-pop music ($t=-2.345$, $p = 0.017$). The shorter page dwell time of the participants with pop music was also higher than the longer time without music intervention (see Figure 3).

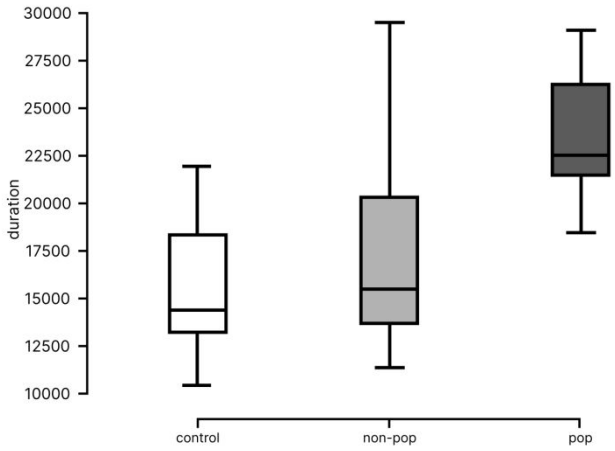

Figure 3: Shopping browsing time of participants in three groups of music environment.

In addition, we conducted eye movement thermogram collection. Through eye movement thermograms, we observed that the intervention of music did not directly increase the frequency of gaze in the original gaze area. Rather, there were certain regional changes in non-popular music scenes. The result of one of the participants' gaze on the same item is taken as an example (see Figure 4). As can be seen, the distribution of the thermogram of attention for non-pop music is shifted to the image part compared to the condition without music intervention. In contrast, the thermogram for the pop music intervention showed an overall increase in the whole page. It can be seen that the music intervention made the participants pay more attention to the information content of the web page with strong visual expression. The neglect of textual information is also related to the distraction of non-pop music. This conjecture is consistent with the results of the previous subjective assessment. The intervention of popular music, on the other hand, had a multifaceted effect on the emotional dimensions of the participants, so that they had a tendency to be more interested in all forms of information about the product.

Figure 4: Eye movement thermogram distribution in three musical environments.

Interview

After the main experiment was completed, we interviewed the participants to find out how they felt during the experiment and what they recalled in detail. Among all the products, we found that the styles that impressed the participants were more likely to have vivid colors. In addition, the design of the product is also known as the reason for attracting the participants. The tendency to buy depends on the evaluation of the product. They believed that the real evaluation of the product would greatly influence their judgment. Therefore the virtual webpage constructed in this study makes the participants' trust in the goods not particularly high. However, with the addition of music, it made them have enjoyment during the whole experiment. Most thought the whole experience of the experiment was good. The introduction of some stories would have made the scene more immersive.

DISCUSSION

In summary, emotion is an important bridging factor for music to influence consumption. When customers feel pleasure, excitement, or dominance due to popular music, they are more likely to have a positive impression of the shopping experience. This positive experience will make them more willing to adopt many behaviors that promote consumption, such as up-selling. In the process, the establishment of an emotional connection between the customer and the brand will also indirectly contribute to their loyalty and trust in the product. On the contrary, non-popular music does not have a sense of familiarity and may lead to hesitation or avoidance of purchase. And one of the most significant increases in emotional arousal will make customers more willing to take risks and thus make purchase decisions. participants' shopping experience in a non-pop music environment may be more oriented towards calmness and indifference. It cannot elicit strong emotional fluctuations similar to pop music. Therefore, the comprehensive experience effect of pop music is stronger in trendy sports brands. More extensive research is needed in the future in the online shopping environment of other types of goods.

What's more, participants were willing to spend more time browsing products and web content in the company of pop music. This suggests that the familiar auditory environment gives users the tendency to explore further on product information. In the same way, familiarity led to an increase in the participants' listening time for music. This enhanced the depth of the shopping experience. The higher attention to visual images, on the other hand, is related to the associative effect of vision and hearing. Therefore, merchants should first consider the image-audio fit relationship when subsequently selecting background music. We also found that customers in a happy mood tend to be more willing to share their shopping experiences and spread positive emotional experiences through word-of-mouth. This can arouse the interest of other potential customers and increase brand awareness and appeal.

CONCLUSION

This study aims to explore the effect of music popularity on online shopping behavior. We selected popular and non-pop songs by selecting them on music platform charts and combining them with participants' subjective reviews. Through the construction of a virtual online shopping platform, we allowed the participants to complete the browsing of several trendy sports goods in different music environments. The results were analyzed from subjective and objective perspectives through eye-tracking, questionnaires and interviews. Our study shows that music popularity significantly influences online shopping consumer behavior. Specifically, in terms of the link between music genres and shopping experience, popular music significantly increased users' attention to products. In addition, familiar music enhances the emotional arousal dimension, which promotes the desire to buy and the desire to share. Our findings contribute to the strategic use of background music in e-commerce shopping environments. Based on the findings, better listening experiences can be created for users in shopping scenarios in the future. In terms of business applications and marketing strategies, merchants can also be guided to utilize music to influence mood changes and thus promote product consumption.

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