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Effects of e-Commerce Websites' Auditory Features on Consumers' Appreciation for Innovative Products

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ABSTRACT

It is has been established that sensory interactions, including sight, hearing, smell, taste and touch, can affect consumers' consumption decisions. While various sensory interactions are devised in the offline context, e-commerce has to rely primarily on vision and hearing due to its inability to access other sensory. Previous IS literature has documented the substantial effects of various visual features. However, very few studies have examined auditory features. Drawing on the recent observation that medium noises enhance people's abstractive thinking and creativity, this study tries to investigate this topic from a novel perspective that ambient sounds can promote users' appreciation of innovative products when shopping online. The preliminary results of a lab experiment show that medium noise or music can improve participants' likelihood of buying innovative products over traditional products, and noise brings other negative effects (e.g. bad mood), while music do not. Theoretical and practical contributions are discussed.

Keywords

Auditory features; E-commerce websites; Ambient sounds; Innovative products; Abstract thinking; Construal levels

INTRODUCTION

Suppose a consumer is evaluating two products of the same product category on a website. The only significant difference between the two options is their innovativeness – one product has a set of ordinary attributes and the other has some innovative and uncommon features. In the meantime, the computer's speaker is turned on and automatically playing the background music from the website at a moderate level of sound. Will this incidental exposure to the ambient sound from the website affect the consumer's product preference?

Consumers' product judgment and consumption decisions are often the function of the information and stimuli collected consciously or unconsciously through multiple sensory interactions, including sight, hearing, smell, taste and touch. While marketers can devise various sensory interaction experiences to influence consumers' product evaluation and purchase decisions in the brick-and-mortar shopping context, e-commerce has to rely primarily on consumers' vision and hearing due to its inability to access to other sensory channels. To the extent that marketing communication through every available sensory channel may make a difference, e-commerce practitioners should have a keen interest to understand how both visual and auditory features on an online shopping website will affect consumer behavior. However, extant literature has mainly studied the influences of visual features, such as presentation formats of products, aesthetic design, and color, on consumers' decision making in the context of online shopping (Cai and Xu 2011; Jiang and Benbasat 2007; Pelet and Papadopoulou 2012). The investigation about auditory features of e-commerce platforms affecting consumption behavior has been scarce. The current study attempts to investigate the effect of music from an e-commerce website on consumers' appreciation of innovative products.

THEORETICAL FOUNDATION

Innovative products differ from traditional products in their possession of uncommon features that can provide novel functionality for consumers. The success of innovative products depends on consumers' attitude. However, new product adoption literature has shown that innovations may overwhelm consumers (Heidenreich et al. 2016). Recent research has provided cumulative evidence showing that a high construal level and associated abstract thinking can lead to greater creativity and enhance consumers' appreciation for innovative products. At a high construal level, people use more abstract, schematic, decontextualized descriptions to represent an object or a problem, and thus think more abstractly and are less likely to fixate. Consequently, people tend to be more able to associate remote information to generate less common and more creative ideas and accept more divergent ideas. In contrast, when people are at a low construal level, they use more concrete, detailed, and contextualized descriptions to represent events and objects. It is hard for individuals' mental system to access remote concepts or elements and deviate from usual and conservative thinking patterns (De Dreu et al. 2009; Forster et al. 2004; Liberman et al. 2012). Recent empirical research has also confirmed the

enhancing effect of high construal level on the appreciation of production innovation. For example, when being primed with a temporally future framing , which can elicit a high construal level, consumers become more likely to accept new products (Jhang et al. 2012). Ambient sounds, any sounds that are unrelated to the focal tasks, can cause a high construal of mental representation, and consequently, improve individuals' creative performance and appreciation of innovative products. For instance, Mehta et al. (2012) find that a moderate (70dB) level of noise, as opposed to low and high levels, enhances performance on creative tasks including remote associates test, unusual uses task, etc. They also find that in a relatively noisy environment people have higher tendency to buy innovative products over traditional products, and this effect is more pronounced for people high in personal innovativeness. They theorize that the distraction caused by a moderate level noise can lead to processing difficulty, which in turn drives people to engage in abstract thinking (high construal level), and then enhances people's creative cognition.

HYPOTHESES DEVELOPMENT

Selection model suggests that external stimuli, whether relate to the focal tasks or not, enter into people's sensory memory for a fraction of a second, and then flow to the next stages in which only the useful information gets through the filter and detector and is received by short-term memory (Broadbent 1958; Treisman 1960). Hence, ambient sounds unrelated to the focal task, even when receiving minor attentive processing, can still enter people's sensory memory and lead to a state of processing difficulty or disfluency, in which individuals have a subjective feeling of lack of ease or speed in processing information. Mehta et al. (2012) find that noise recorded at real life venues can prevent people from concentrating on their focal tasks. Processing disfluency introduced by ambient sounds can induce a higher construal level, leading people to engage in abstract thinking. When the sound distraction is relatively medium and does not demand considerate cognitive resources, it enables individuals to think more abstractly and also have enough cognitive resources to connect all of the incoming information to build creative ideas. With a high construal level, individuals' thinking is less fixated and their cognitive flexibility is shifted upward (Pyone and Isen 2011). To better appreciate the benefits of an innovative product, consumers should engage in cognitive activities linking remote concepts such as their product knowledge, possible consumption contexts, potential uncommon function requirements, and distinct features of the product.

H1: Medium ambient noise from the website enhances people's appreciation of innovative products.

Studies have also shown that music is as distracting as noise (Furnham and Strbac 2002). For instance, (Henderson et al. 1945) suggest that music, even peaceful classic music without lyric, can distract people when they are reading and impair their reading efficiency. Therefore, we expect music will also have a positive effect on consumers' appreciation innovative products when shopping online.

H2: Medium ambient music from the website enhances people's appreciation of innovative products.

RESEARCH METHODOLOGY

To test our hypotheses, we conducted a lab experiment. This paper presents the preliminary results based on data so far collected. The experiment involved three conditions: noise, music, and control. In the noise condition, we blended a combination of a multi-talker and a roadside traffic soundtrack to imitate ambient noise reflecting typical consumption contexts. In the music condition, we chose Mozart's Piano Sonata in D Major, K. 448 as background sound. There is evidence that classic music has the ability to distract people (Henderson et al. 1945). The two MP3 soundtracks were plugged into a fictitious e-commerce website. When subjects began to browse the website, the ambient sounds played automatically. The speakers' volume was adjusted to generate medium (65 dB) level of sound, tested by a decibel meter. In the control condition, subjects completed the focal task in a relatively quiet lab with ambient sound varying between 30dB and 40dB while no soundtrack was played.

To assess participants' appreciation of innovative products, we measured their likelihood of buying innovative products over tradition ones. We prepared six pairs of different products for this experiment, and two options were offered in the same product category. Among them, three pairs (extension cord, mountain bike, and weighting machine) had an obvious difference in innovativeness level such that the innovative products had more new functions than the traditional ones. The other three pairs (sport T shirt, camera, and respirator) did not differ in innovativeness features. Figure 1 presents the examples of screenshots of the experiment webpages. Participants indicated their likelihood of buying the second option over the first one on a 7-point scale (1=not at all, 7=very much).

Forty-eight university students participated in this experiment, one person at a time in exchange for a chocolate worth 2 US dollars. Participants were randomly assigned to the three conditions. Participants were told to read the product descriptions carefully and browse the six pairs of products one by one and indicate their likelihood of buying the second over the first one. Upon completing the purchase task, we measured the participant's heart rate

to assess arousal level (Mehta et al. 2012). Next, the participant answered an online survey with items capturing their demographics, and other control variables. The sequence of measuring heart rate and answering the questionnaire for all the participants was counterbalanced.

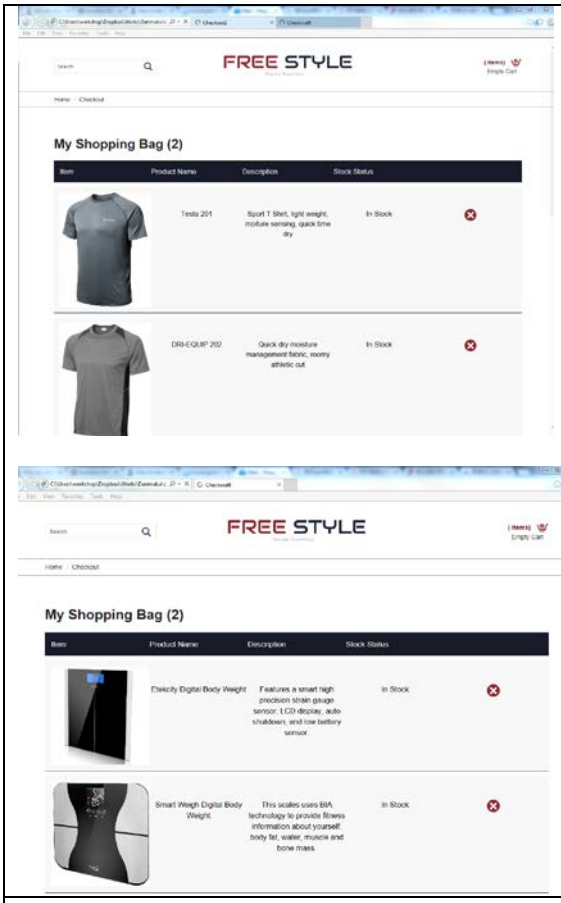

Figure 1. Modified Research Model

PRELIMINARY RESULTS

Our dependent variables were relative buying likelihood. Combining the three pairs of non-innovative and innovative product, as anticipated, a 3 level one-way ANCOVA test (noise vs. music vs. no background sound) revealed a main effect of ambient sound on participants' likelihood of buying innovative products over traditional products ($F(2,45)=6.97$, $p=0.003$), such that people in noise condition ($M=5.54$; $p<0.01$) and music condition ($M=5.38$; $p<0.01$) had more tendency to buy innovative products than those in no background sound group ($M=4.54$). The difference between noise and music conditions was not significant ($p=0.48$). Most covariates were not significant except gender ($F(1,46)=5.68$, $p=0.022$). In the case of pairs of products with no innovative differences, ambient sounds had no effect on consumers' buying likelihood of one over the other one ($F(2,45)=0.42$, $p=0.66$). All the means of relative buying likelihood were about 4 ($M_{noise} = 3.91;\ M_{music} = 4.22;\ M_{control} = 4.29$), which confirmed ambient sounds, including noise and music, only affected people's preference for products with innovative attributes. These results lend support for H1 and H2.

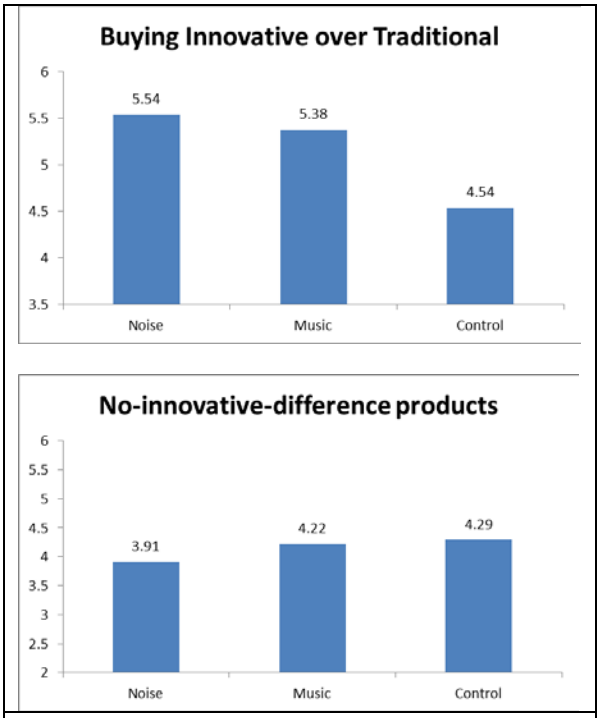

Figure2. The effect of ambient sounds on preference of innovative products

To exclude the possible confounding effects, we analyzed participants' responses on the mood items and heart rate used as a proxy for arousal. First, we found that noise ($M=3.39$) can spoil participants' mood compared with music ($M=4.64$; $p=0.05$) and no background sound ($M=4.30$; $p=0.01$), and there was no significant difference between participants in the music and control groups ($p=0.49$). Second, noise ($M=73$) could also marginally increase participants' arousal level (heart rate) than those in control group ($M=67.4$; $p=0.09$), and there was no significant difference between control and music group ($M=69.4$; $p=0.28$). But neither mood nor arousal affect relative buying likelihood. Thus, the effects of ambient sounds were not mediated by arousal or mood.

DISCUSSION

Summary, Limitation, and Future work

This study explored the effects of ambient sounds from an e-commerce website on individuals' appreciation and buying likelihood of innovative products over traditional ones. Specifically, we reaffirmed that ambient noise, as implemented by the website's playing of roadside noise soundtrack, can increase individuals' preference of

innovative products over the ordinary ones (Mehta et al 2012). More importantly, we demonstrated that music embedded within the e-commerce website, classical piano music in our case, had a similar enhancing effect on the appreciation of innovative products. Interestingly, we found that, while the presence of noise could dampen participants' mood and elicit arousal, music did not produce these effects. This shows that participants' heightened appreciation of innovative products in the music condition occurred in a setting as natural as in the control condition with minimum auditory intervention. There are some limitations in our research. First, our sample size was small. We are still collecting data with the current experiment setting to strengthen the robustness of our findings and conclusions. Second, we will reveal the mediation mechanism underlying the effects of auditory features on creative product judgment. Fourth, we will investigate other aspects of the positives effect of website auditory features on consumers' preference for innovative products. Moreover, we also plan to explore the effect of music as ambient sound more deeply. We intend to study whether basic features of music, such as types of music and tempo, as well as the relationships between the music and website content or product category, would distract individuals differently and result in varying effects on people's appreciation of innovation.

Theoretical Contributions and Practical Implications

Our findings advance the existing literature on website design. Extant literature has shown that visual features of online shopping contexts such as lightness and color, have significant effects on browsers' mood and engagement, and can affect their memorization and buying intention. Focusing on website auditory features, this research demonstrates that embedding ambient sounds within a website can enhance people's appreciation of innovations. In addition, the research also contributes to the literature on the positive effect of contextual distractions. The research has important practical implications. Product innovation is a critical competitive strategy. However, high rates of innovation failure have been reported in recent innovation literature. The main reason of innovation failure is consumers' inability to appreciate innovations. This research provides suggestions to companies on how to enhance consumers' ability to understand innovative features when they are shopping online. For example, they can add some medium music in their official websites or other e-commerce websites when presenting their new products, or they can blend their advertisement with music elements. As the Internet has increasingly become the critical platform for product presentation and sales, our findings provide valuable implications for innovators to shape consumers' responses to their innovative products.

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