Shopping in a virtual world: the influence of spatial crowdedness of apparel store on consumer impulsive buying tendency

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Introduction. With the development of advanced technologies, such as virtual reality (VR), retailing has been transforming into a new era (Hughes, 2021). VR refers to "the representation of physical objects and spaces through high-definition digital images that allow individuals to be immersed in a fully digital environment simply by wearing a headset" (Pizzi et al., 2020, p.502). Due to Covid-19, VR has gradually emerged as a new marketing tool in e-commerce. Though VR store is increasing in popularity and attention, the current research on VR application in investigating consumer behaviors is embryonic and limited to exploring consumers' adoption of the immersive VR shopping environment (e.g., Luna-Nevarez & McGovern, 2021; Peukert et al., 2019). According to van Rompay et al. (2011), a retail store's environmental design factors (e.g., spatial crowdedness) are critical in influencing consumer shopping experiences. Moreover, consumers' shopping orientation may affect their perception of the retail store's environmental factors (van Rompay et al., 2011). In other words, environmental factors may be seen differently by consumers who have a specific product buying goal in mind compared to those who only shop in stores for recreational purposes. In addition, impulsive buying tendency is a vital factor that significantly boosts sales for brands (Lee & Johnson, 2010) because consumers always shop without planning in advance. Thus, the present study investigates how spacious crowdedness and consumers' shopping orientation may affect consumers' perception of the VR store image and their impulsive buying behavior in the VR apparel shopping environment drawing on the Stress Theory and Impulse Buying Theory.

Hypotheses development. Drawing on the stress theory, Das and Varshneya (2017) indicated that consumers perceive spatial crowdedness as psychological stress when their shopping space demand cannot be satisfied. The stress from the limited shopping space will arouse consumers' unfavorable impressions of a store (Blut & Lyer, 2020). In particular, when consumers' shopping goals are interfered with by the level of spatial density, negative emotions and impressions of a store thus are elicited (Mehta, 2013). Consequently, the high crowdedness VR store may lead consumers to have a less positive perception of the VR store image for task-oriented consumers (H1). In addition to the store image, the store's spatial crowdedness also affects consumers' impulsive buying tendencies. Rook and Fisher (1995) defined impulsive buying tendency as "a consumer's tendency to buy spontaneously, unreflectively, immediately, and kinetically" (p.306). It is a sudden behavior that occurs when consumers experience fun and entertainment (Beatty & Ferrell, 1998). Considering that a high-density store may produce consumers with higher

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shopping stress (Das & Varshneya, 2017), we propose that the low crowdedness VR store leads to a stronger impulsive buying tendency for recreation-oriented consumers (H2). Further, according to Mohan et al.'s (2013) study, higher evaluations of a store lead to higher levels of impulsive buying tendency. Therefore, the VR store image may positively affect consumers' impulsive buying tendencies (H3). In addition, as flow experience occurs when consumers fully immerse in an activity, significantly affecting their perception, attitude, and behaviors (Webster et al.,1993), we consider flow experience as a control variable in our proposed model.

Method. The current study used a 2 (spatial crowdedness: high vs. low) × 2 (shopping orientation: task-oriented vs. recreation-oriented) between-subjects experimental design to test the proposed relationships. According to the power analysis results ($f = 0.30$, $p = 0.05$, $k = 4$), 173 undergraduate and graduate students from a southeastern university were recruited as participants for this experimental study to secure an actual power of 0.80 (Cohen, 1988, 1992). To develop the stimuli, SketchUp was used to design two VR apparel stores with different levels of spatial crowdedness (high vs. low), and two different shopping orientation scenarios were developed based on previous literature (task-oriented vs. recreation-oriented). A pretest was implemented to confirm the stimuli, and the t-test results showed that there is a significant difference ($t(77) = 4.799$, $p < 0.001$) between the high spatial crowdedness and low crowdedness VR stores ($M = 3.83$, $SD = 2.05$ vs. $M = 2.05$, $SD = 1.08$). The difference between the task-oriented and recreation-oriented shopping scenario ($M = 1.36$, $SD = 0.49$ vs. $M = 1.78$, $SD = 0.42$) is also significant ($t(93) = -4.463$, $p < 0.001$). After confirming the stimuli, the main experiment was conducted. Participants ($N = 173$) were randomly assigned to one of four conditions and were asked to complete a pre-survey first. Once they completed the pre-survey, they were asked to wear a VR headset and shop in a virtual apparel store. The participants were told to freely explore the virtual apparel store as much as they would like. After the store exploration, the participants completed a post-survey online. Then, two-way ANCOVA and regression were conducted to test the suggested hypotheses using SPSS.

Results. For the purpose of the manipulation check, we measured spatial crowdedness and shopping orientation and the t-test results showed a significant difference in VR store spatial crowdedness ($t(171) = 7.934$, $p < 0.001$)) between high and low ($M = 3.99$, $SD = 1.88$ vs. $M = 2.07$, $SD = 1.24$) and shopping orientation ($t(171) = -7.867$, $p < 0.001$)) between task-oriented and recreation-oriented ($M = 3.34$, $SD = 1.80$ vs. $M = 5.35$, $SD = 1.56$), indicating a successful manipulation. All the suggested hypotheses are supported except for H1. The two-way ANCOVA results indicated a significant interaction effect of spatial crowdedness and shopping orientation on perceived store image ($F(3,167) = 4.365$, $p = 0.038$, $\eta^2 = 0.026$). However, it showed an opposite prediction with H1, revealing that task-oriented consumers will perceive a more positive store image when they shop in a high level of spatial crowdedness VR store. For H2, a significant interaction effect of spatial crowdedness and shopping orientation on impulsive buying tendency was found ($F(3,167) = 6.397$, $p = 0.012$, $\eta^2 = 0.012$), showing that recreation-oriented consumers will urge to buy products impulsively when they shop in a low level of spatial crowdedness VR store. In addition, the regression results supported H3, indicating that

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the perceived VR store image positively influenced consumer impulsive buying tendency ($F(1, 171) = 7.625$, $R^2 = 0.043$, $p = 0.006$).

Discussion. The findings of this study contribute to the literature by demonstrating the Stress Theory and Impulsive Buying Theory in the virtual shopping environment. The results mainly present the relationship between the apparel store layout design and customers' perceptions of a store image and their impulsive buying tendency. In particular, the findings indicate that a high level of spatial crowdedness may lead to task-oriented consumers' more positive perceptions of the VR store image and elicit their impulsive buying tendency. Surprisingly, this finding contradicts the effects of store spatial crowdedness in the physical shopping environment. This may be because the limited VR store space will not physically obstruct consumers; meanwhile, the high spatial crowdedness of a VR apparel store offers consumers more virtual shopping experiences to explore. Besides, our findings confirm that recreation-oriented consumers may perceive a more positive store image when they shop in a low-level spatial crowdedness VR store. It provides insight for apparel brands to design VR store layouts to convey a positive store image and arouse consumers' impulsive tendencies.

References:

Beatty, S. E., & Elizabeth Ferrell, M. (1998). Impulse buying: Modeling its precursors. Journal of Retailing, 74(2), 169–191. https://doi.org/10.1016/s0022-4359(99)80092-x

Blut, M., & Iyer, G. R. (2020). Consequences of Perceived Crowding: A Meta-Analytical Perspective. Journal of Retailing, 96(3), 362–382. https://doi.org/10.1016/j.jretai.2019.11.007

Cohen, J. (1988). Statistical power analysis for the behavioral sciences. Second Edition. Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers.

Cohen, J. (1992). Quantitative methods in psychology: A power primer. Psychological Bulletin, 112(1), 155-159.

Das, G., & Varshneya, G. (2017). Consumer emotions: Determinants and outcomes in a shopping mall. Journal of Retailing and Consumer Services, 38, 177–185. https://doi.org/10.1016/j.jretconser.2017.06.008

Hughes, J. (2021, April 20). The role of VR in the future of ecommerce. Wordtracker. https://www.wordtracker.com/blog/marketing/the-role-of-vr-in-the-future-of-ecommerce

Pizzi, G., Vannucci, V., & Aiello, G. (2020). Branding in the time of virtual reality: Are virtual store brand perceptions real? Journal of Business Research, 119, 502–510. https://doi.org/10.1016/j.jbusres.2019.11.063

Lee, J., & Johnson, K. K. P. (2010). Buying Fashion Impulsively: Environmental and Personal Influences. Journal of Global Fashion Marketing, 1(1), 30–39. https://doi.org/10.1080/20932685.2010.10593055

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Luna-Nevarez, C., & McGovern, E. (2021). The Rise of the Virtual Reality (VR) Marketplace: Exploring the Antecedents and Consequences of Consumer Attitudes toward V-Commerce. Journal of Internet Commerce, 20(2), 167–194. https://doi.org/10.1080/15332861.2021.1875766

Mehta, R., Sharma, N. K., & Swami, S. (2013). The impact of perceived crowding on consumers' store patronage intentions: Role of optimal stimulation level and shopping motivation. Journal of Marketing Management, 29(7–8), 812–835. https://doi.org/10.1080/0267257x.2012.729075

Mohan, G., Sivakumaran, B., & Sharma, P. (2013). Impact of store environment on impulse buying behavior. European Journal of Marketing, 47(10), 1711–1732. https://doi.org/10.1108/ejm-03-2011-0110

Peukert, C., Pfeiffer, J., Meißner, M., Pfeiffer, T., & Weinhardt, C. (2019). Shopping in Virtual Reality Stores: The Influence of Immersion on System Adoption. Journal of Management Information Systems, 36(3), 755–788. https://doi.org/10.1080/07421222.2019.1628889

Rook, D. W., & Fisher, R. J. (1995). Normative Influences on Impulsive Buying Behavior. Journal of Consumer Research, 22(3), 305. https://doi.org/10.1086/209452

van Rompay, T. J. L., Tanja-Dijkstra, K., Verhoeven, J. W. M., & van Es, A. F. (2011). On Store Design and Consumer Motivation. Environment and Behavior, 44(6), 800–820. https://doi.org/10.1177/0013916511407309

Webster, J., Trevino, L.K., & Ryan L. (1993). The dimensionality and correlates of flow in human computer interactions. Computers in Human Behavior, 9(4): 411–426.

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