

Towards a virtual haptic signature: how texturing the screen improve consumer product understanding and purchase intention.

Abstract

In this study, we show that adding active haptic stimulation via haptic rendering to mobile marketing enhances consumption-context value and adds economic value for retailers, but this effect differs according to the given consumption context and task orientation. Specifically, with a set of three experiments, we examine how experiencing higher multisensory stimulation by adding active haptic stimulation for in-app experiences enhances customer responses towards the retailer and improve product in-app evaluation during the experiential phase. We also show that priming customers sense of touch with active stimulation leads to higher time spent on another and unrelated tasks in another mobile app. Implications for retailers are discussed with future research avenues.

1 INTRODUCTION

Chris Ullrich, Chief Technology Officer at Immersion, defines haptics from its feeling, as no words can accurately describe it, and warns about the “real word” touch ability of the computer. To put it more formally, he defines it as “a way for computer and humans to have common tactile direction” (Haptics Club, January 16th 2022). The provided definition show how much haptics is complex to create a computer-mediated touch experience but also that haptics, despite its long history, remains a fantasy for a large part of the population, and this is particularly true for consumption context compared to medical training, space and flight training, gaming, etc. This has been emphasized with the worldwide sanitary situation who pushed forward the e-commerce into the customer journey and raised awareness around the absence of product tactile sensation online. Moreover, it is predicted that, by 2023, most customers will definitely integrate e-commerce into their purchase habits to reach a worldwide increase of 12% (Xerfi, 2021)¹.

Even though mobile marketing was of interest before this crisis [28], the newest appeal of mobile shopping has raised an important issue for marketers: how can a brand meet the need for sensory stimulation when shopping with mobile devices, particularly for experiential good (vs. search goods) [20], and when the access to the physical product is highly restricted before purchase?

1.1 Direct touch effect

In the past decades, product presentation on mobile devices has become more interactive and sensory based in the delivery of product information [11,19,25,27], but still fails to provide accurate product description while it reduces product returns compared to traditional online channel [36]. The development of haptic technology for smartphones devices now provides for more original and sensorial experiences for mobile shopping, which should increase even more retailers’ interest for this specific customer touchpoint in a near future [4,34]. Indeed, smartphones present the advantage of reaching customers at distance in their private sphere thanks to their ability to create confidence, and the highly intimate and personal status of the smartphone itself, along with haptic properties that consumers find pleasurable. All of this provides “e-reassurance” [18].

Thus, acknowledging the importance of smartphones as a direct customer touch point [15,32], we now turn to a set of multidisciplinary set of findings on tactile stimulation on a mobile device via the “direct-touch” effect (i.e., the tactile stimulation provided by touchscreens), and the impact of this touch on consumer product evaluation and choice [5,6,25,29]. Specifically, previous research on the influence of the “direct-touch” effect shows that touch modifies consumers’ product choice and decision-making as well as the perception of product attributes [6]. In line with it, previous research has shown that the use of touchscreen-based devices adds to the attraction of a choice among hedonic products [29]. A more recent extension of this research shows that changing the type of haptic stimulation rendered by the interface may modify product perception and purchase intention according to sensory similarity perception between the “direct-touch” effect and the tactile product cues (Racat et al., 2021). To our knowledge, the above papers are the only investigations of the effect of the touchscreen tactile attribute (active or passive haptic feedback) [16] that provide a more direct relation with the online content on consumer behavior.

¹ Xerfi 2021 21XDIS03 www.xerfi.com

1.2 Active haptic stimulation for consumption

Given those results, we aim with the current study to demonstrate that adding active haptic stimulation to mobile marketing enhances customer journey and adds economic value for retailers. We further investigate the “direct-touch” effect based on its ability to provide more accurate sensations via haptic rendering under both a hedonic and utilitarian orientation when shopping or consuming via the smartphone [9]. Doing so, the present research contributes to what we know about the impact of mobile devices like smartphones that possess haptic capability. To our knowledge, only one article in marketing [8] has investigated existing haptic technology in smartphones. That work has demonstrated that consumers can dissociate various tactile stimulations provided by it (i.e., vibrations) for communication purposes. It is wholly unclear as to whether that can or does happen when it comes to product attribute information.

Accordingly, we investigate the following research question: does mobile haptic rendering technology enable consumers to perceive actual tactile product properties during consumer-product interaction? More specifically, if a haptic rendering technology enables to simulate haptic sensations in relation with the product tactile cues during a real-time interaction, does the haptic stimulation enable consumers to better process product information in a mobile shopping context? Applying the experiential paradigm in marketing and the grounded cognition theory for sensory information processing, we look at the underlying mechanism of how tactile information provided by the mobile device increases consumers responses.

2. Methodology

Drawing from the above stream of research, we bring into the marketing literature a viable and ecological set of studies for understanding the effect of haptic rendering technology on consumer behavior during mobile product exploration by looking at marketing outcomes, i.e., brand and product related, and cognitive variable (mental imagery and memorization). Given the importance of corroborating research findings [1], we provide confirmation of previous findings in showing that the haptic stimulation (active and passive) induced by a touchscreen when interacting with the product (i.e., the direct touch effect) influences consumer response (study 1), and we extend our knowledge via the investigation of haptic rendering technology offering a product texture-like simulation on smartphones device (study 2a). Finally, we provide preliminary insights on the priming effect of haptic rendering stimulation for unrelated task (study 2b).

In Study 1, we determine the effect of a touchscreen on brand recognition, consumer satisfaction towards the brand and the overall appreciation of the mobile app. Study 2a digs into the “direct-touch” effect by testing the impact of active haptic rendering stimulation on the screen that a priori fits with the product’s actual tactile cues and its effect on unrelated task (study 2b).

3. Results and Discussion

3.1 Results

Study 1 and 2 confirm that active haptic feedback influences mobile experience whether it is an active or passive haptic stimulation. This further confirms preliminary results of the impact of higher sensory enabling environment for marketing, particularly active tactile stimulation [10,12,13], but also more recently the effect of letting people either being stimulated via unrelated touch sensation [5,6,29] or via haptic imagery [14,17,25]. Our findings lead to contradictory conclusion as in study 1 active stimulation provide more positive experience and in study 2a it decreases the experiential value. In these two contexts, consumers are stimulated without explanation of the active haptic stimulation purpose.

3.2 Theoretical implications

Thus, we assume that they have difficulties to connect the haptic sensation felt with the product experience (study 2a) while in the gaming experience (study 1) it relates to the action and haptic feedback acts as a confirmation cue, leading consumers to better identified the meaning and usefulness of it. These results go in line with previous exploratory results from active stimulation from the interface showing that consumer relate the active haptic stimulation with the product cues when they do not rely on their sense of touch. Yet, consumers did not identify the tactile stimulation as a diagnostic cue for the product when they scored high in instrumental need for touch. In the present study, the individual touch preference seemed to have almost no effect in any study, despite marginal effect of autotelic need for touch. These findings question the ability of the individual need for touch measure to catch the need to touch product with the new hybrid environment consumers evolve in. Even though it remains an individual trait that have high importance for retailers, we may think that consumers have come to cross-canal strategies in terms of multisensory stimulation and thus use complementary information to balance the lack of one specific modality, here the sense of touch [21,22,24]. However, and interestingly, consumers did not recall the brand name but were

highly capable to remember the logo, in both active and passive haptic stimulation (study 1) and the haptic stimulation had a significant impact on consumer interaction with the product on the viewing modality only (zooming option) such as active stimulation encourage participant to look closer to the product (Study 2a). What is also of interest in this second study is that consumers had a positive recall of product movement ability given by the 3D rotation and zooming options. Also, despite the absence of significant difference between conditions, the visual texture effect or the active stimulation with lower product texture level demonstrated higher recall effect.

Following these findings, we can imagine that either an overlapping or overload effect is more and more present into computer-mediated shopping, here m-commerce [26]. Multisensory experience has been proved to be beneficial for retailers [30,31,33,35] but the hybrid reality of consumers may lead to confusion and the non-identifiable haptic feedback for consumption purpose may lead the consumer to reject the haptic stimulation for now as other applications encounter success in shaping behaviors [23]. Furthermore, the present findings indicate that consumer process all sensory stimulation and reenact previous experience to use them as a referential [2,3], but the absence of indication and guidance for interpretation seems to block the ease of sensory information processing and lead to distract consumers actions.

3.3 Managerial implications

Research in computer sciences has come to real improvement with the possibility to render with high fidelity the feeling of texture through the interface [34]. Yet, our findings clearly show the need of understanding the human perception of tactile stimulation in computer-mediated interaction, and this is even more important for consumer markets where the sensory perception need to be embedded into the customer experience as flowing [7].

Based on this research, we can identify that providing game-based consumption experience, where the aim of haptic sensations is to confirm specific actions, might be more relevant than actual matching with product tactile properties so far. Besides, the utilitarian value is not at all identified by consumers despite the positive comments on product interaction ability and the apparent match between the haptic sensation and the product during the pre-test phase. The three contexts, where haptic stimulation has been explored, show that in more fun experiences it is well interpreted and that when it comes to diagnostic it remains unrelated. In the service experience, the priming did not show higher or lower impact in terms of brand and economic outcomes. Thus, implementing haptic stimulation beyond the passive stimulation from the touchscreen might be tricky and risky to date if not well explained to the customer. One way to exploit the effect would be to incorporate a possibility for the consumer to consciously activate the haptic stimulation when examining the product to “learn” the haptic information and relate it to the content viewed. This option seems of interest as many consumers report to turn off their phone most of the time, and thus vibration too via the silent mode, due to the work or social environment. This implies that they are less stimulated by active haptic sensations and more by the interface tactile properties and its tactile interaction for actions [20]. We encourage retailers to consider the impact of device more than before as the switch towards new interfaces might be closer than expected in the future. Yet, based on these results and interesting input from the industry, a change in interface might also be the solution to consider the active haptic feedback to obtain tactile information in virtual environment, and most likely related to material and geometric properties than action related. Finally, the present research presents several limits that are inherent to experimental design. The sample size remains low to identify such new effect. Then, the technology employed, even though being familiar to consumers, were not well understood and this probably had a strong effect on the different context in use.

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