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PSYCHOLOGY AND PSYCHIATRY
REPLICATION

Effects of haptic imagery on purchase intention

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Abstract

The COVID-19 pandemic has increased the popularity of online shopping, and companies are looking for ways to provide consumers with experiences that online shopping cannot provide, such as touching products and imagining them in use. In this context, the importance of haptic imagery of products showcased online is increasing. This study replicated and extended Peck et al.'s (2013, *Journal of Consumer Psychology*, *23*, 189–196) finding that physical control and psychological ownership mediate the influence of haptic imagery on purchase intention. This study showed that imagining touching a product increased purchase intention through the mediation of physical control and psychological ownership compared with not imagining, conceptually replicating Peck et al.'s study. This study also examined the moderating effect of product involvement and showed that there was no moderator role of product involvement. The findings would have a practical application in marketing, such as encouraging consumers to imagine touching the product.

Key words: haptic imagery; involvement; physical control; psychological ownership; purchase intention

Introduction

The ongoing COVID-19 pandemic has altered consumers' purchasing behavior, driving the transition from shopping in physical stores to online shopping (e.g., Guthrie et al., 2021; Kim, 2020). While browsing in a physical store allows the customer to hold and touch the product, buying online does not, which is a concern raised by consumers when shopping online (Rathee & Rajain, 2019). Companies have responded to these concerns by offering various methods for consumers to learn about their products without having to actually visit a store. For example, Macy's, a department store chain in the U.S., offers a virtual reality (VR) experience in which customers can use a headset to clearly understand the size and color of the actual purchase and easily find the product they want (Macy's, 2021). HaptX, a U.S.-based haptics company, has developed tactile gloves and suits that simulate touch (HaptX, 2021). Such tactile experiences in VR influence consumers' product evaluation (e.g., vicarious haptic effect: Luangrath et al., 2021); however, even without special machines such as VR, merely imagining the use of a product might increase purchase motivation. In fact, Peck et al. (2013) found that by simply closing one's eyes, touching a product imaginarily, and thinking about how it would feel increased physical control and psychological ownership of that product. Focusing on Peck et al. (2013), this study examined how haptic imagery by a simple method of imagining touching a product influenced consumers' purchase intentions.

This study conceptually replicated and developed Peck et al.'s (2013) study in three ways. First, this study examined whether physical control and psychological ownership mediated the effect of haptic imagery on increasing purchase intention. Peck et al. (2013, study 3) showed that vivid haptic imagery increased physical control and psychological ownership, and this study examined the influence of this

process on purchase intention. Since psychological ownership is associated with greater willingness to pay (Brasel & Gips, 2014) as well as purchase intention (Spears & Yazdanparast, 2014), it would be reasonable that haptic imagery could influence purchase intention through physical control and psychological ownership. In fact, Iseki and Kitagami (2016) showed that haptic imagery increased purchase intention by increasing physical control and psychological ownership. This study also examined whether the results could be replicated.

Second, this study examined the effects of closing one's eyes and imagining touching (vs. not imagining). Peck et al. (2013) examined the effect of imagining with one's eyes closed (vs. eyes open) through a laboratory experiment; however, in real-life online shopping situations, it is unlikely that people close their eyes when selecting a product. Based on its applicability in marketing, this study examined whether imagining touching, even without one's eyes closed, increases purchase motivation via a physical control and psychological ownership compared to not imagining.

Third, this study examined the moderating effect of product involvement. According to previous studies (for a review, Jussila et al., 2015; Peck & Luangrath, 2022; Pierce et al., 2003), the degree that psychological ownership occurs depends on the target attributes. Jussila et al. (2015) stated, "Quite obviously, if the target is not attractive or does not capture the individual's attention, psychological ownership for that target cannot develop" (p. 127). Similarly, Pierce et al. (2003) stated that an association with the object is important for psychological ownership to occur. According to Peck and Luangrath (2022), one of the antecedents to psychological ownership is to have more information and knowledge about a target. These findings suggest that the degree of involvement with a product moderates the effect of haptic imagery on psychological ownership; however, this has not been empirically examined. Therefore, this study examined whether product involvement moderates the effect of haptic imagery on purchase intention through physical control and psychological ownership. Therefore, by conceptually replicating Peck et al. (2013) considering these three points, this study examined the psychological process by which haptic imagery influenced consumers in more detail.

Materials and methods

Participants

Overall, 303 Japanese undergraduates (186 men, 113 women, and 4 who did not specify their sex; $M_{age} = 20.40$ years) participated. Subsequently, 300 participants were included in the analysis, excluding three international students.

Preliminary survey

Prior to the experiment, a preliminary survey was conducted with 16 Japanese undergraduates (10 males, 6 females; $M_{age} = 20.31$ years) to select products with high and low involvement for Japanese university students. For the six products with relatively high tactile importance (ballpoint pen, sweatshirt, aroma hand cream, stick scissors, freestanding pen case, and tumbler) used in Iseki and Kitagami's (2017) study among Japanese university students, participants were asked to respond to five items about product involvement (e.g., "This is a product about which I would like to collect information"; $\alpha = .90$) using a seven-point scale. Based on these results, the aroma hand cream, which had a relatively high-involvement score ($M = 5.13$, SD = 1.46), was selected as the high-involvement product; and the freestanding pen case, which had a relatively low-involvement score ($M = 3.08$, SD = 1.06), was chosen as the low-involvement product.

Measures

Participants were asked to respond to a two-item physical control (Peck et al., 2013; $r = .82$, $p < .001$; $M = 3.46$, SD = 1.69), three-item psychological ownership question (Pierce et al., 2001; $\alpha = .95$, $M = 2.35$,

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SD = 1.46), and a two-item purchase intention question ($r = .90$, $p < .001$; $M = 2.54$, SD = 1.43; "I want to purchase the product" and "I want the product") using a seven-point scale.

Procedure

The experiment was developed for this study and conducted online (see Supplementary Material for the questionnaire). Participants were randomly assigned to one of four conditions: involvement (low vs. high) × imagery (no imagery vs. haptic imagery). In the haptic imagery condition, participants were asked to imagine how they would feel if they touched or held the product. Conversely, in the no-imagery condition, participants were asked to consider whether they would purchase the product. They were then instructed to look at a product image that matched the condition. Participants were then shown product images for 30 s and asked to respond to items on psychological ownership and purchase intention. Subsequently, a debriefing session was conducted.

Results

Mediation analysis

First, serial multiple mediation analysis (Hayes, 2022, PROCESS v4, Model 6) was conducted to examine whether haptic imagery influences purchase intention through the mediation of physical control and psychological ownership. The analysis was conducted with the haptic imagery condition (0 = no imagery, 1 = haptic imagery) as the independent variable, purchase intention as the dependent variable, and physical control and psychological ownership as the mediator variables. As shown in Figure 1, the indirect effect of haptic condition on purchase intention, mediated by physical control and psychological ownership, was significant ($\beta = .14$, SE = .05, 95% CI [.06, .24]). Therefore, the results of Peck et al.'s (2013) study were replicated and developed; similar results were presented by Iseki and Kitagami (2016). Neither the indirect effect, in which the haptic condition affects purchase intention via physical control ($\beta = .07$, SE = .09, 95% CI [−.11, .26]), nor the indirect effect in which the haptic condition affects purchase intention *via* psychological ownership ($\beta = -.04$, SE = .06, 95% CI [−.15, .08]), were significant.

Moderated mediation analysis

Next, to examine whether product involvement moderates the effect of haptic imagery on purchase intention via physical control and psychological ownership, a moderated serial multiple mediation analysis (Hayes, 2022, PROCESS v4, Model 85) was conducted, in which the haptic imagery condition (0 = no imagery, 1 = haptic imagery) was the independent variable, purchase intention was the

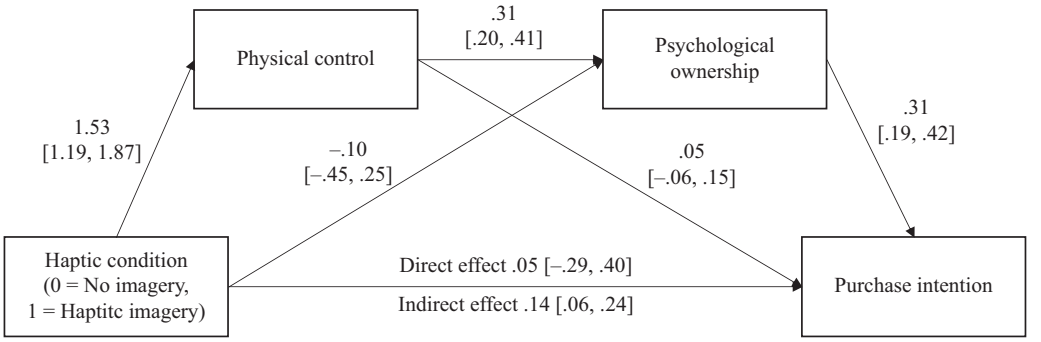

Figure 1. Results of the serial multiple mediation analysis. Values are standardized coefficients and 95% confidence intervals are provided in parentheses.

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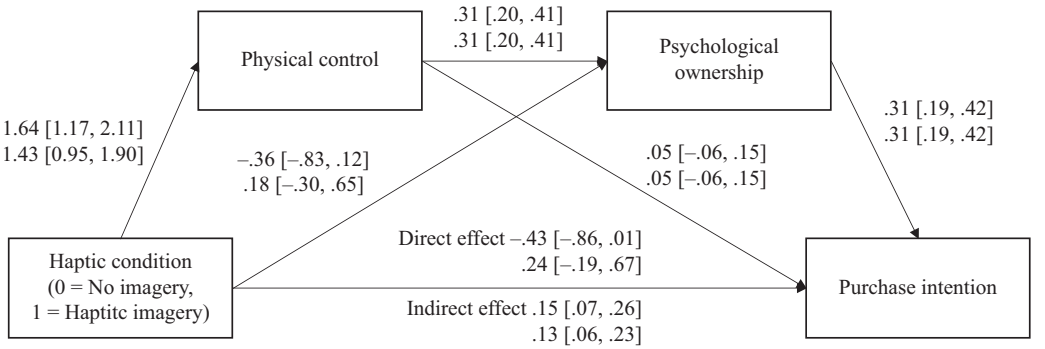

Figure 2. Results of the moderated serial multiple mediation analysis. Values are standardized coefficients and 95% confidence intervals are provided in parentheses. Upper row: low-involvement condition; lower row: high-involvement condition.

dependent variable, physical control and psychological ownership were the mediator variables, and the involvement condition (0 = low condition, 1 = high condition) was the moderator variable. The results showed no significant difference in the conditional indirect effects between the low (β = .15, SE = .05, 95% CI [.07, .26]) and high product involvement conditions (β = .13, SE = .05, 95% CI [.06, .23]; index = −.019, SE = .03, 95% CI [−.09, .04]), which means there was no moderating effect of product involvement (Figure 2). Thus, regardless of the degree of product involvement, haptic imagery mediated physical control and psychological ownership and influenced purchase intention.

Discussion

This study conceptually replicated the findings of Peck et al. (2013, study 3). Table 1 summarizes the differences between this study and that of Peck et al. (2013). The results showed that haptic imagery mediated physical control and psychological ownership, and increased purchase intention, replicating and extending the study by Peck et al. (2013). This result is consistent with that reported by Iseki and Kitagami (2016).

This study showed that imagining touching a product without closing one's eyes increased purchase intention through physical control and psychological ownership compared to not imagining it. Academically, this finding further extends previous research on haptic imagery (e.g., Brasel & Gips,

Table 1. Summary of Peck et al. (2013) and the current study

	Peck et al. (2013, Study 3)	Current study
Participants	Not stated (most likely nonstudents)	Japanese undergraduates
Experimental methods	Laboratory experiment	Online experiment
Experimental manipulation of haptic imagery	Eyes open versus eyes closed	Haptic imagery versus no imagery
Dependent variable	Psychological ownership	Purchase intention
Target products	Blanket	Pen case versus aroma hand cream
Mediation analysis method	Multiple group structural equation model	Hayes (2022, PROCESS v4, Model 6)
Key findings	The more vivid the haptic imagery with eyes closed, the greater the physical control and psychological ownership	Haptic imagery increases physical control and psychological ownership, which increases purchase intention, independent of the degree of product involvement

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2014; Iseki & Kitagami, 2016; 2017; Krishna & Schwarz, 2014; Peck et al., 2013) or psychological ownership (e.g., Peck & Shu, 2009; Pierce et al., 2003; Reb & Connolly, 2007; Shu & Peck, 2011; Wolf et al., 2008). From a practical perspective, this result might be useful for marketing strategies. While previous studies have suggested the importance of advertising messages and images in enhancing consumer's mental simulation (e.g., Gavilan et al., 2014; Lee & Choi, 2022; Lv et al., 2020; Silva et al., 2020), the results suggest that even a simple message asking people to imagine touching or using the product might be effective for enhancing their purchase intention.

Limitations

In this study, the moderating role of the degree of product involvement was not found. However, the moderating effect of product involvement needs to be examined further. Although not significant ($\beta = .53$, SE = .32, 95% CI [−.10, 1.16], $p = .10$), the positive and negative coefficients of haptic imagery on psychological ownership differed between low ($\beta = -.36$, SE = .24, 95% CI [−.83, .12]) and high-involvement conditions ($\beta = .18$, SE = .24, 95% CI [−.30, .65]), suggesting the influence of product involvement on psychological ownership. One potential reason for the lack of the moderating effect could be that the selected products were not attractive to participants. In fact, in the experiment, participants' purchase intention was low ($M = 2.54$ using a seven-point scale), which may have made it difficult to see the moderating effect of product involvement. In addition, since this study did not control for participants' purchasing behavior prior to participating in the psychological experiment, the possibility that participants' preexperimental purchasing experiences might have diminished the manipulation of involvement condition could not be denied. Owing to these limitations, further studies using different products and procedures are needed.

Open peer review. To view the open peer review materials for this article, please visit http://doi.org/10.1017/exp.2023.1.

Supplementary materials. To view supplementary material for this article, please visit http://doi.org/10.1017/exp.2023.1.

Data availability statement. The data that support the findings of this study are available from the corresponding author upon reasonable request.

Authorship contributions. The author confirms being the sole contributor of this work and has approved it for publication. The author read and approved the final manuscript.

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Conflict of interest. The author declares none.

Ethics standards. The Research Ethics Code of the Nihon University College of Commerce states that psychological experiments involving hypothetical situations do not require the consent of the Research Ethics Committee. All participants were presented with a written explanation of the survey, and only those participants who agreed to cooperate with the survey completed the survey.

References

Brasel, S. A., & Gips, J. (2014). Tablets, touchscreens, and touchpads: How varying touch interfaces trigger psychological ownership and endowment. *Journal of Consumer Psychology*, **24**, 226–233. https://doi.org/10.1016/j.jcps.2013.10.003

Gavilan, D., Avello, M., & Abril, C. (2014). The mediating role of mental imagery in mobile advertising. *International Journal of Information Management*, **34**, 457–464. https://doi.org/10.1016/j.ijinfomgt.2014.04.004

Guthrie, C., Fosso-Wamba, S., & Arnaud, J. B. (2021). Online consumer resilience during a pandemic: An exploratory study of e-commerce behavior before, during and after a COVID-19 lockdown. *Journal of Retailing and Consumer Services*, **61**, 102570. https://doi.org/10.1016/j.jretconser.2021.102570

HaptX. (2021). *Virtual reality*. https://haptx.com/virtual-reality

Hayes, A. F. (2022). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (3rd ed.). The Guilford Press.

Iseki, S., & Kitagami, S. (2016). Mere touching imagery promotes purchase intention through increased psychological ownership. *Journal of Human Environmental Studies*, **14**, 49–54. https://doi.org/10.4189/shes.14.49

Iseki, S., & Kitagami, S. (2017). Effects of haptic imagery and haptic importance on psychological ownership. *Journal of Human Environmental Studies*, **15**, 59–64 (in Japanese). https://doi.org/10.4189/shes.15.59

Jussila, I., Tarkiainen, A., Sarstedt, M., & Hair, J. F. (2015). Individual psychological ownership: Concepts, evidence, and implications for research in marketing. *Journal of Marketing Theory and Practice*, **23**, 121–139. https://doi.org/10.1080/10696679.2015.1002330

Kim, R. Y. (2020). The impact of COVID-19 on consumers: Preparing for digital sales. *IEEE Engineering Management Review*, **48**, 212–218. https://doi.org/10.1109/EMR.2020.2990115

Krishna, A., & Schwarz, N. (2014). Sensory marketing, embodiment, and grounded cognition: A review and introduction. *Journal of Consumer Psychology*, **24**, 159–168. https://doi.org/10.1016/j.jcps.2013.12.006

Lee, H. K. & Choi, D. (2022). Can I touch the clothes on the screen? The mental simulation for touch in online fashion shopping. *Journal of Fashion Marketing and Management*, ahead-of-print, 1–18. https://doi.org/10.1108/JFMM-09-2021-0238

Luangrath, A. W., Peck, J., Hedgcock, W. M., & Xu, Y. (2021). Observing product touch: The vicarious haptic effect in digital marketing and virtual reality. *Journal of Marketing Research*, **59**, 306–326. https://doi.org/10.1177/002224372110595

Lv, X., Li, H., & Xia, L. (2020). Effects of haptic cues on consumers' online hotel booking decisions: The mediating role of mental imagery. *Tourism Management*, **77**, 104025. https://doi.org/10.1016/j.tourman.2019.104025

Macy's. (2021). *What is a virtual reality headset?* https://www.macys.com/ce/electronics-and-tech-gadgets-guide/what-is-a-virtual-reality-headset-how-to-use-vr-headset

Peck, J., Barger, V. A., & Webb, A. (2013). In search of a surrogate for touch: The effect of haptic imagery on perceived ownership. *Journal of Consumer Psychology*, **23**, 189–196. https://doi.org/10.1016/j.jcps.2012.09.001

Peck, J., & Luangrath, A. W. (2022). A review and future avenues for psychological ownership in consumer research. *Consumer Psychology Review*, **6**, 52–74. https://doi.org/10.1002/arcp.1084

Peck, J., & Shu, S. B. (2009). The effect of mere touch on perceived ownership. *Journal of Consumer Research*, **36**, 434–447. https://doi.org/10.1086/598614

Pierce, J. L., Kostova, T., & Dirks, K. T. (2001). Toward a theory of psychological ownership in organizations. *Academy of Management Review*, **26**, 298–310. https://doi.org/10.2307/259124

Pierce, J. L., Kostova, T., & Dirks, K. T. (2003). The state of psychological ownership: Integrating and extending a century of research. *Review of General Psychology*, **7**, 84–107. https://doi.org/10.1037/1089-2680.7.1.84

Rathee, R., & Rajain, P. (2019). Online shopping environments and consumer's need for touch. *Journal of Advances in Management Research*, **16**, 814–826. https://doi.org/10.1108/jamr-12-2018-0116

Reb, J., & Connolly, T. (2007). Possession, feelings of ownership, and the endowment effect. *Judgment and Decision Making*, **2**, 107–114.

Shu, S. B., & Peck, J. (2011). Psychological ownership and affective reaction: Emotional attachment process variables and the endowment effect. *Journal of Consumer Psychology*, **21**, 439–452. https://doi.org/10.1016/j.jcps.2011.01.002

Silva, S. C., Rocha, T. V., De Cicco, R., Galhanone, R. F., & Manzini Ferreira Mattos, L. T. (2020). Need for touch and haptic imagery: An investigation in online fashion shopping. *Journal of Retailing and Consumer Services*, **59**, 102378. https://doi.org/10.1016/j.jretconser.2020.102378

Spears, N., & Yazdanparast, A. (2014). Revealing obstacles to the consumer imagination. *Journal of Consumer Psychology*, **24**, 363–372. http://doi.org/10.1016/j.jcps.2014.01.003

Wolf, J. R., Arkes, H. R., & Muhanna, W. A. (2008). The power of touch: An examination of the effect of duration of physical contact on the valuation of objects. *Judgment and Decision Making*, **3**, 476–482.

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Peer Reviews

Reviewing editor: Dr. Jessica Payne
University of Notre Dame, Notre Dame, Indiana, United States, 46556

Minor revisions requested.

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Review 1: Effects of haptic imagery on purchase intention

Reviewer: Dr. Vivek Aggarwal

Date of review: 31 August 2022

Conflict of interest statement. Reviewer declares none.

Comment

Comments to the Author: This study specifically analyses the effect of haptic imagery on consumer purchase decisions which respects and enhances the online shopping experience, which contains useful and new information to justify publication. However, there are many mistakes in the paper, including data analysis, grammar, spelling, capitalization like although study uses moderation analyses but word mediation is used. The mistakes of data analysis may reflect that the authors are not serious and rigorous when writing this article. So, it will require substantial revisions.

The section of the literature review needs to be extended to include notable studies from the relevant area. Also, in this part, the author must express more reasons for motivation and innovation for doing this research.

The results of data analysis are not presented clearly, and there are some mistakes in data analysis. Results of moderation analysis are not

Score Card

Presentation

4.4 /5

Is the article written in clear and proper English? (30%)	5/5
Is the data presented in the most useful manner? (40%)	5/5
Does the paper cite relevant and related articles appropriately? (30%)	3/5

Context

5.0 /5

Does the title suitably represent the article? (25%)	5/5
Does the abstract correctly embody the content of the article? (25%)	5/5
Does the introduction give appropriate context? (25%)	5/5
Is the objective of the experiment clearly defined? (25%)	5/5

Analysis

Does the discussion adequately interpret the results presented? (40%)	4/5
Is the conclusion consistent with the results and discussion? (40%)	4/5
Are the limitations of the experiment as well as the contributions of the experiment clearly outlined? (20%)	4/5

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Review 2: Effects of haptic imagery on purchase intention

Reviewer: Dr. Jusmawati Fauzaman

Date of review: 09 September 2022

Conflict of interest statement. Reviewer declares none

Comment

Comments to the Author: Since this experiment is conducted online, should there be a control measure to ensure that the participants are not involved in other activities that might confound their intention toward a purchase? For example, Restrict themselves from involving in any online purchase an hour before the experiment.

Score Card

Presentation

4.6 /5

Is the article written in clear and proper English? (30%)	5/5
Is the data presented in the most useful manner? (40%)	4/5
Does the paper cite relevant and related articles appropriately? (30%)	5/5

Context

5.0 /5

Does the title suitably represent the article? (25%)	5/5
Does the abstract correctly embody the content of the article? (25%)	5/5
Does the introduction give appropriate context? (25%)	5/5
Is the objective of the experiment clearly defined? (25%)	5/5

Analysis

5.0 /5

Does the discussion adequately interpret the results presented? (40%)	5/5
Is the conclusion consistent with the results and discussion? (40%)	5/5
Are the limitations of the experiment as well as the contributions of the experiment clearly outlined? (20%)	5/5