

# The Effects of Presence and Tactile Illusion on Consumers' Attitudes and Intentions: The Mediating Role of Mental Imagery and the moderators' effects

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## Abstract

*This paper investigates the relationship between presence, tactile illusion, vividness of imagery and advertising effectiveness. A total of 207 undergraduate students participated for an experiment. The result of path analysis found that presence and tactile illusion induce more vivid mental imagery. Vividness of mental imagery was a major contributor to consumers' attitudes toward the website. Spatial presence and realness had a partial impact on advertising effectiveness. There were main effects of site type and NFT on some of advertising effectiveness measures with interaction effects for product type and site type, and for product type, site type, and NFT. Theoretical reasoning and practical implications for the results are followed.*

*Keywords---* Presence, cross-modal illusion, mental imagery, 3D advertising, advertising effectiveness

## 1. Introduction

Despite the importance of touching in consumers' decision making, this sense is not usually available when we try online shopping. It is possible to virtually experience a product by interacting with 3D graphic images instead. Previous researches [1, 2] show that a sense of presence is an important mediator in this virtual product experience and have a positive impact on web advertising effectiveness. It is also found that, in a virtual environment, presence stimulates synesthesia[3]. Will it be possible that this cross-modal illusion have a compensating effect for deficient sensory cues (e.g., haptic information) in a virtual store? The purpose of this study is to investigate the relationship between presence, tactile illusion, and advertising effectiveness. The paper also examines the difference in advertising effectiveness by product type, site type, and consumer's need for touch (NFT).

## 2. Presence and cross-modal illusion

Developing mental model in a virtual environment is greatly influenced by the way human process multimodal information. The human sensorimotor system works for an object or an event simultaneously and dynamically. It perceives incoming sensory stimuli from different modalities as a whole not as separate [4]. The multisensory information

processing incurs cross-modal interaction and perceptual illusion (e.g. ventriloquism). Both presence and synesthesia may be phenomenal byproducts of the same intermodal integration process, the building of a cognitively consistent mental model of the environment [3]. Therefore, they will be correlated each other.

## 3. Presence, imagery, and persuasion

Presence experience results from the interpretation of the mental model of the virtual environment. Vivid elements in virtual environments are basically attention getting and they activate relevant information in memory [5] to fill the missing information from the sensory stimuli. When imagery is a mental event visualizing something, presence from concrete mental model may lead to more vivid or richer mental imagery. Recent researches show that presence develops virtual experience to positively influence attitudes and intentions [1, 2]. Presence is also enhanced by 3D advertising and influences product knowledge, brand attitude, and purchase intention by creating a compelling virtual product experience [1]. One interesting finding in their research was that when evaluating material product<sup>9</sup>, Jacket in the study, 3D advertising resulted in more favorable brand attitude and better product knowledge than 2D condition. The beneficial effects of imagery on persuasion has been summarized in 3 ways: (1) by possibly drawing information stored in long term memory into working memory; (2) by anchoring in the personal experience to make it more relevant; (3) by providing multisensory experience [6].

## 4. The effects of moderating variables

Products differ in the extent to which they possess salient material properties that correspond to texture, hardness, temperature, and weight information [7]. Product categories in which the material properties vary in a diagnostic manner are more likely to encourage touch. In addition to product-based sources of salience for haptic information, the haptic salience is also likely to depend on the person. For example, more haptically oriented consumers with high NFT, consider material properties earlier during product evaluation and have greater chronic accessibility to haptic information [8]. Mode of presentation

<sup>9</sup> Objects with attributes that require touching for understanding are called material products. Comparatively, objects with attributes that can be fully understood through vision are called geometric objects [1, 7].

(e.g., 3D vs. 2D) may do a similar role as it affects presence [1]. Therefore, moderating effects of these variables (product type, consumer's NFT, and presentation format) will be tested in the experiment.

## 5. Method

For an experiment, 2 (presentation format: 2D vs. 3D) x 2 (product type: watch vs. jacket) x 2 (consumer trait: high vs. low NFT) factorial design was employed. A total of 207 undergraduate students (105 males: 50.7%) from a large university in Seoul participated as subjects. The experiment used two different products: watch and jacket. Watch was selected as a geometric product and Jacket as a material one (for this classification, see [1]). Web sites with 2D and 3D format were developed for each product and 3D images were aided by interactive features such as zooming, moving, and rotating. Presence was measured by 3 components: spatial presence, involvement, and realness [9]. Measures for the tactile illusion were developed based on the reasoning from the previous research [7]. All other measures came from previous studies. Most of measures resulted in high reliability ranging from .83 to .96, excepting the realness of presence (.61).

## 6. Results

Structural equation model was revised until the goodness of fit indices stayed at acceptable level. The major contributor for site attitudes was the vividness of mental imagery that was influenced by spatial presence ( $\beta=.17$ ), realness ( $\beta=.16$ ), and tactile illusion ( $\beta=.14$ ). Tactile illusion was highly influenced by realness ( $\beta=.55$ ) but not by spatial presence. Entertaining site attitude was affected by spatial presence ( $\beta=.16$ ) and brand attitude by realness ( $\beta=.27$ ). As in dual mediation model, brand attitude mediated the effects of site attitudes to purchase intention. The result of multivariate analysis showed significant main effects of site type (Wilks's  $\lambda=.78$ ,  $F=7.68$ ,  $p<.01$ ) with interaction effects between product type and site type (Wilks's  $\lambda=.92$ ,  $F=2.28$ ,  $p<.05$ ). Univariate analysis of variance showed significant main effects of site type on site ent. ( $F=17.36$ ,  $p<.01$ ), site info ( $F=14.82$ ,  $p<.01$ ), and VI ( $F=14.93$ ,  $p<.01$ ). Two-way Interaction for product type and site type is significant on site ent. ( $F=4.05$ ,  $p\leq.05$ ), brand attitude ( $F=4.61$ ,  $p\leq.05$ ), PI ( $F=11.47$ ,  $p<.01$ ), and VI ( $F=4.71$ ,  $p\leq.05$ ). The main effects of need for touch was significant only on site ent. ( $F=3.72$ ,  $p\leq.05$ ). Three-way interaction for product type, site type, and need for touch was significant on VI.

## 7. Conclusion

The vividness of mental imagery is found to be a key resource to persuade consumers in a virtual environment. It directly influenced website attitudes. The result vindicates

that imagery is a powerful tool for changing the state of mind and body. Realness contributed a lot for tactile illusion, while spatial presence and involvement did not have any significant effects on the illusion. Spatial presence had a positive effect on vividness of imagery, entertaining attitude toward the site but not on informative site attitude. Mental imagery was composed by presence and cross-modal illusion elements.

Overall, the research found that 3D advertising is more effective than 2D in persuading consumers' attitude and intention in the website. However, due to the interaction for product type and site type, 3D advertising was more effective in geometric products than in material goods. The effects of consumer traits were quite limited. Consumers' NFT had marginally significant effects on entertaining attitude toward the site. By interacting with product type and site type, NFT affected only revisiting intention.

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## References

- [1] Li, H., Daugherty, T., & Biocca, F. (2002). Impact of 3-D advertising on product knowledge, brand attitude, and purchase intention: the mediating role of presence, *Journal of Advertising*, 31(3), 43-57.
- [2] Coyle, J. R. & Thorson, E. (2001). The effects of progressive levels of interactivity and vividness in web marketing sites, *Journal of Advertising*, 30(3), 65-77.
- [3] Biocca, F., Kim, J., & Choi, Y. (2001). Visual touch in virtual environments: an exploratory study of presence, multimodal interfaces, and cross-modal sensory illusions, *Presence*, 10(3), 247-265.
- [4] Soto-Faraco, S., Spence, C., Lloyd, D., & Kingstone, A. (2004). Moving multisensory research along: motion perception across sensory modalities, *Current Directions in Psychological Science*, 13(1), 29-32.
- [5] Nisbett, R. & Ross, L. (1980). *Human inference: strategies and shortcomings of social judgment*, Englewood Cliffs, NJ: Prentice-Hall.
- [6] Burns, A., Biswas, A., & Babin, L. (1993). The operation of visual imagery as a mediator of advertising effects, *Journal of Advertising*, 22(2), 71-85.
- [7] Klatzky, R., Lederman, S., & Matula, D. (1991). Imagined haptic exploration in judgments of object properties, *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 17(March), 314-322.
- [8] Peck, J. & Childers, T. (2002). Individual differences in haptic information processing: on the development, validation, and use of the Need for Touch scale, working paper, Department of Marketing, University of Wisconsin-Madison.
- [9] Schubert, T., Friedmann, F., & Regenbrecht, H. (2001). The experience of presence: factor analytic insights, *Presence*, 10(3), 266-281.