Effects of Immersion and Visual Angle on Brand Placement Effectiveness

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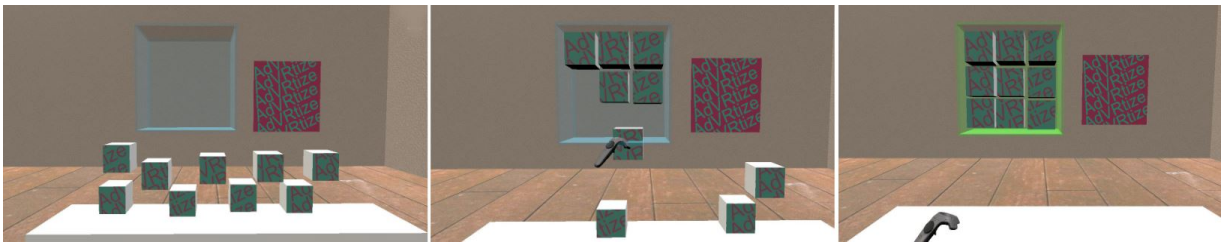

Figure 1: We exposed participants to brand placements. Placements came in either the form of a puzzle (green cubes) or a poster (red poster). Left: Puzzle cubes lie on a table before the assembly. Center: User already positioned 5 cubes. Right: The target box changes to green when the puzzle is complete.

Abstract

Typical inherent properties of immersive Virtual Reality (VR) such as felt presence might have an impact on how well brand placements are remembered. In this study, we exposed participants to brand placements in four conditions of varying degrees of immersion and visual angle on the stimulus. Placements appeared either as poster or as puzzle. We measured the recall and recognition of these placements. Our study revealed that neither immersion nor the visual angle had a significant impact on memory for brand placements.

Index Terms: Human-centered computing—Human computer interaction (HCI)—HCI design and evaluation methods; Human-centered computing—Human computer interaction (HCI)—Empirical studies in HCI; Human-centered computing—Interaction paradigms—Virtual Reality;

1 Introduction

Product or brand placement is "*a marketing practice in advertising and promotion wherein a brand name, product, package, signage, or other trademark merchandise is inserted into and used contextually in a motion picture, television, or other media vehicle for commercial purposes*" [10]. A common approach to determine the effectiveness of product placement is through *recognition* and *recall* [7]. Research has found increased memory recall for brands in 3D content in comparison to 2D content after exposure [9]. Thus, embedding product placement in virtual environments (VEs) appears to be promising [6]. Experiencing these virtual product placements in immersive Virtual Reality (VR) may enhance their effectiveness, e.g., immersing a user in a VE provides a higher visual angle or field of view (FOV) on the stimulus. For this reason, we propose an experimental setup consisting of the same stimulus presented either in (a) *low* or *high immersion*, or (b) with different *visual angles*. Such an experiment would allow us to identify the effects of each individual factor.

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Table 1: Overview of manipulated factors per condition.

Condition	Immersion	Stimulus Visual Angle
IVR	high, 110° FOV	high
VR low FOV	high, 45° FOV	high
Desktop VR	high, 110° FOV	low, 24 inches monitor
Desktop	low	low, 24 inches monitor

2 Theoretical Background

Immersive VR provides the means for an easy change of perspective, direct interaction with virtual objects, and hence close inspection of said objects. Immersion is "*the extent to which the computer displays are capable of delivering an inclusive, extensive, surrounding, and vivid illusion of reality to the senses of a human participant*" [8]. This leads to a higher visual angle on a particular stimulus, e.g., a product, in immersive VR. A higher visual angle increases the emotional responses to audiovisual stimuli [2]. These characteristics of immersive VR could enhance the product placement effectiveness. Since the degree of immersion and the visual angle may cause an influence, we target each factor individually in the present study.

Marketers commonly measure brand placement effectiveness by the consumer's attitude towards products [3] and the memory they have for those products or brands [7]. Demographic characteristics such as age, ethnicity, and gender influence consumer's attitudes [1], rendering memory as the more general measurement. Recall and recognition are typical metrics for brand placement effectiveness [7]. Research shows a better recall of the position of items in a VE [5] or steps of a completed tasks [4] when using VR instead of desktop-3D. This effect may also apply to product placement memory.

3 Method

We developed four versions of a puzzle game (see Fig. 1 and Table 1) varying in the degree of immersion and visual angle, i.e., *Immersive VR (IVR)*, *VR low FOV*, *Desktop VR* and *Desktop*. Brand placements and non-brand images appear either as a puzzle or a poster in the background. Both the puzzle and the poster had the same apparent size and one showed a brand while the other always displayed a non-brand picture. Players had to solve 10 puzzles in total with 10 brands and 10 non-brand images. Two seconds after solving a puzzle, the images of the puzzle and poster changed. The system randomly drew the images out of a pool of 14 brand logos and 14 non-brand images. Each image only appeared once.

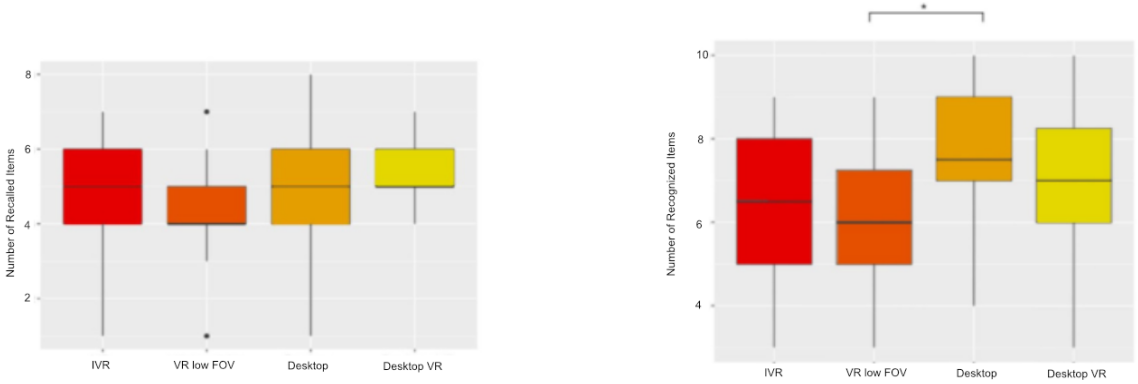

Figure 2: Tukey-style box plots for the recall scores. Left: Comparison of the total recall scores between the conditions. Right: Comparison of the total recognition scores between the conditions.

Table 2: Descriptive statistics. Values are $M(SD)$.

	IVR	VR low FOV	Desktop	Desktop VR
Recall	4.6 (1.5)	4.4 (1.27)	5.1 (1.74)	5.25 (0.97)
Recog.	6.55 (1.88)	6.05 (1.64)	7.6 (1.54)	7.1 (1.71)

We used our four versions as between-factors. For recall, participants had to list the names of all brands they could remember. The higher the number of correctly listed brands, the better the recall. We measured recognition by showing all 14 brand pictures that were encoded in our system. Participants marked all encountered brand images (”Yes” or ”No”). The higher the number of correctly recognized brands, the better the recognition. Since 10 brands were shown during the study, the number of correctly recalled and recognized items ranged from 0 to 10.

4 Results

80 participants (21 male, 59 female; *Mean age*= 23.74, *SD*= 5.53) took part in this study.

A Kruskal-Wallis test found no significant difference regarding recall between the four conditions, $H(3) = 5.26$, $p = .15$; see Table 2 and Fig. 2 left. Computing a Kruskal-Wallis, we found a significant difference between the four conditions concerning recognition, $H(3) = 8.314$, $p = .04$; see Table 2 and Fig. 2 right. Follow-up Bonferroni adjusted pairwise Wilcoxon tests revealed a significantly higher recognition in *Desktop* than in *VR low FOV*, $p = .04$.

5 Discussion

We found no significant differences between our conditions for the recognition and recall scores between *Desktop VR* and *Desktop*. This indicates that immersion did not affect brand placement memory. However, we found a significant difference between *VR low FOV* and *Desktop* for recognition. This could be a result of the reduced FOV of the *VR low FOV*. The 45° FOV potentially resulted in the poster not being completely visible when the participants directly focused on the puzzle. Changes in the image of the poster were not as apparent and might have been overlooked. As a result, participants could not recognize all brands shown. When testing for an effect from the visual angle, we found no significant difference between the conditions of *IVR*, *VR low FOV*, and *VR desktop*. Here, we manipulated the visual angle on the stimulus. Emotions evoked by the visual angle seem to not affect product placement memory.

6 Conclusion

Our results revealed no effect of the degree of immersion or visual angle on recall and recognition of brand placements. This implies that neither immersion nor the visual angle affects product placement effectiveness. Future work should research the impact of displaying the actual product instead of a mere brand logo. This could especially be effective in immersive VR. Here, products can be inspected up close and experienced in a spatial way.

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The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

References

[1] F. De Gregorio and Y. Sung. Understanding attitudes toward and behaviors in response to product placement. *Journal of Advertising*, 39(1):83–96, 2010. doi: 10.2753/JOA0091-3367390106

[2] D. Gall and M. E. Latoschik. Visual angle modulates affective responses to audiovisual stimuli. *Computers in Human Behavior*, 109:106346, 2020.

[3] Z. Glass. The Effectiveness of Product Placement in Video Games. *Journal of Interactive Advertising*, 8(1):23–32, 2007. doi: 10.1080/15252019.2007.10722134

[4] J. Harman, R. Brown, and D. Johnson. The role of immersion during situated memory recall within virtual worlds. *Proceedings of the 28th Australian Computer-Human Interaction Conference, OzCHI 2016*, pp. 1–10, 2016. doi: 10.1145/3010915.3010945

[5] E. Krokos, C. Plaisant, and A. Varshney. Virtual memory palaces: immersion aids recall. *Virtual Reality*, 23(1):1–15, 2019. doi: 10.1007/s10055-018-0346-3

[6] T.-W. Lui, G. Piccoli, and B. Ives. Marketing strategies in virtual worlds. *ACM SIGMIS Database*, 38(4):77, oct 2007. doi: 10.1145/1314234.1314248

[7] B. G. Pitts and J. Slattery. An examination of the effects of time on sponsorship awareness levels. *Sport Marketing Quarterly*, 13(1):43–54, 2004.

[8] M. Slater and S. Wilbur. A framework for immersive virtual environments (five): Speculations on the role of presence in virtual environments. *Presence: Teleoperators & Virtual Environments*, 6(6):603–616, 1997.

[9] R. Terlutter, S. Diehl, I. Koinig, and M. K. Waiguny. Positive or negative effects of technology enhancement for brand placements? memory of brand placements in 2d, 3d, and 4d movies. *Media Psychology*, 19(4):505–533, 2016.

[10] K. Williams, A. Petrosky, E. Hernandez, and R. Page. Journal of Management and Marketing Research Product placement effectiveness. pp. 1–24, 2011.