Playful persuasion

Advergames as gamified advertising

van Berlo, Z.M.C.

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The Role of Presence in the Processing of Branded VR Content

Zeph M. C. van Berlo, Eva A. van Reijmersdal, Edith G. Smit & L. Nynke van der Laan

In the early summer of 2016, influential technology entrepreneur and philanthropist Elon Musk sparked controversy by stating that 'the odds that we are in base reality is one in billions' (Solon, 2016). Where he eluded at the idea that we might already live in a simulated reality (much like the plot of the 1999 blockbuster The Matrix), Musk predicted that, with the current rate of technological development, virtual reality (VR) will one day be indistinguishable from reality.

Despite VR currently being far from indistinguishable from the real world, head-mounted display (HMD) VR technology, also often referred to as *immersive VR* (Seibert & Shafer, 2018), does aim to mimic reality. By utilizing various perceptual illusions in a simulated virtual world, this technology creates an experience that feels real for a person wearing an HMD headset.

An example of such an illusion would be the use of stereoscopic imaging to create the illusion of depth. By projecting a slightly different image into each of the player's eyes, HMD VR technology utilizes the way human brains tend to process visual information: both eyes send slightly different visual information to the brain, where this information is then fused into one coherent image—an image that includes depth. This slight difference, which is called binocular disparity, can easily be experienced without any VR gear: hold up your finger and focus on it with one eye closed, then switch and close your other

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eye instead while keeping the same focus. Seemingly your finger moved slightly when switching between eyes, where in reality your finger remained in the same position. Exactly this disparity in visual information from the two eyes enables the brain to detect depth and is utilized by HMD VR technology to create the 'illusion of depth' in virtual reality.

Of course this is just a single example, though by utilizing several of such illusions HMD VR technology enables users to engage with a virtual space that 'feels' real. The technology creates, what Lombard and Ditton (1997) defined as, a 'perceptual illusion of nonmeditation', which means that user's phenomenal awareness of both the technology and the external real-world are diminished by the medium (Riva et al., 2007). In the academic literature, this idiosyncratic sensation of 'being there' in the virtual environment (instead of in the real-world) is often called *presence* (Sanchez-Vives & Slater, 2005).

Presence is believed to enhance the vividness and intensity of people's experience in VR (Gabana et al., 2017) and is something that can be valuable for advertisers and brands due to its potentially persuasive attributes. Correlational evidence for this was found in a recent study by Tussyadiah et al. (2018), who showed that presence is positively related to increased attitudes and behavioral intentions in the context of VR tourism marketing. Moreover, research has shown that in specific cases presence can enhance memory performance of information presented in VR (Lin et al., 2002), which can also be valuable for advertisers looking to drive brand awareness.

Only recently, researchers (e.g., Chen & Wang, 2019; Martínez-Navarro et al., 2019; Roettl & Terlutter, 2018; Wang & Chen, 2019) have started to explore the potential opportunities for brands to utilize HMD VR for commercial purposes. Most of these studies have however focused on in-game VR advertising and other multi-brand applications of VR advertising, leaving much still unknown about the effectiveness of branded VR content from a single brand. Moreover, the potential mediating role of presence in such persuasive contexts has remained largely unexamined. This study therefore aims to contribute to the understanding of the role of presence by examining how it affects the processing of brand information when playing branded VR games from a single brand—also known as VR advergames.

Branded Virtual Reality Games

Branded VR games are defined as covert advertising messages designed to look like regular VR games. They are to VR games what advertorials are to editorial content, meaning that despite their aesthetic similarities, they conceptually differ from regular VR games in the sense that they have a persuasive intent and regular VR games do not (Evans & Park, 2015). In other words, regular VR games are designed to entertain, where

branded VR games are designed to persuade—with entertainment being their means rather than their end.

The effectiveness of this type of advertising is often attributed to its interactive nature (Terlutter & Capella, 2013). By utilizing game mechanics and game design, gamified advertising is believed to drive consumers' engagement with the branded content and ultimately facilitate the persuasive process—driving various brand responses like brand recognition (e.g., Van Berlo, Van Reijmersdal, Rozendaal, 2017) and brand attitude (e.g., Wise et al., 2008).

Moreover, in gamified branded content brand indicators (like logos) often serve as a functional part of the game, rather than simply being displayed in the background (Terlutter & Capella, 2013). This means that when playing branded VR games, interacting with a brand is often essential to the task that is being performed by the player—for example winning the game. This functional interaction with the brand is expected to improve the encoding of this information, which would then facilitate the retrieval of this information from memory in the future. The following hypothesis is therefore proposed:

H1: Playing branded VR games positively influences brand memory.

The Role of Presence in a Persuasive Context

When studying VR effects, one of the most important psychological mechanisms to consider is presence. An often used definition is given by Witmer, Jerome, and Singer (2005), who describe presence as 'a psychological state of "being there" mediated by an environment that engages our senses, captures our attention, and fosters our active involvement' (p. 298). Furthermore, they suggest that presence can be conceptualized using four interconnected factors: involvement, sensory fidelity, immersion, and interface quality.

Where this four-factor conceptualization of presence can be criticized, for example because the factors sensory fidelity (i.e. coherence of sensory stimuli) and interface quality (i.e. performance of the technology) conceptually seem predictors rather than indicators of presence, it does offer a complete operationalization of a person's experience when playing a branded VR game—and seems therefore suitable when examining the role of presence in this context. The other two factors, involvement and immersion, are psychological states that are, according to Witmer et al. (2005), necessary conditions for presence; involvement as a state in which all attention is focused on (elements of) the VR experience and immersion as the feeling of being completely submersed in the virtual environment.

The likelihood of a person experiencing presence is affected by the richness of a medium and by the user's perception of control while engaging with this rich media content (Klein, 2003). For players of HMD VR games, this means that the multi-sensory

stimulation and overall interactive experience many HMD VR games offer, increase the likelihood of players experiencing presence (Seibert & Shafer, 2018). In addition to these two factors, Riva et al. (2007) identified that people's emotions also influence the intensity of this experience in a reinforcing relationship; meaning that experiencing higher levels of arousal strengthens a person's feeling of presence when playing a HMD VR game—and vice versa.

This positive relationship between arousal and presence was recently corroborated in an e-commerce context (Martínez-Navarro et al., 2019) and is important to consider when examining the effectiveness of branded VR games. In particular, because the brand indicators (e.g., logos) embedded in these games are believed to elicit emotional responses from players. Maxian et al. (2013), showed that exposure for as little as 6 seconds to logos from well-liked brands elicit arousal. Branded VR games are thus expected to elicit stronger emotional responses than otherwise identical non-branded VR games. Considering the symmetrical relationship between arousal and presence, this would mean that playing branded VR games, compared to non-branded VR games, would elicit overall higher levels of arousal and stronger feelings of presence. In sum, branded VR games from well-liked brands are thus believed to induce stronger feelings of presence than non-branded (yet otherwise identical) VR games.

This increase in presence is believed to improve memory performance and the processing and encoding of information presented in VR (Lin et al., 2002). In a commercial context, this would suggest that people who experience stronger feelings of presence, from interacting with well-liked brand information in a branded VR game, will subsequently be better able to remember this brand information. In sum, presence is thus believed to mediate the effect of playing branded VR games and enhance the successful encoding and consolidation of brand memory—ultimately resulting in better overall brand memory. The following hypothesis is proposed:

H2: The effect of playing branded VR games on brand memory is mediated by presence.

Methodology

Participants and Procedure

To test the hypotheses an experiment was conducted with a single factor (branded VR game vs. non-branded VR game) between-subjects design. The sample consisted of 81 young adults (72.8% female) with an average age of 22.04 years old (*SD* = 2.74). The participants were randomly assigned to play one of two versions of a VR game on an HTC

Vive with two hand-held controllers. The HTC Vive is HMD VR hardware, which enables its users to look around a virtual space (360º) and to interact with virtual objects within the VR experience. Moreover, participants were able to physically move around inside the virtual environment, within a maximum play area of about twelve square meters. After completing the game, the participants were asked to participate in a 5-minute long bogus taste-test and then fill out a questionnaire containing the items measuring brand memory and presence, demographic information, and the manipulation check.

Stimulus Material

The data that were used in this study were collected during a larger VR project (N = 202). For that project three versions of a VR game were developed of which two were used in this study. The first was a branded VR game (n = 40) with an embedded prominently placed logo of the popular chocolate brand Milka. The second served as a control game (n = 41) and did not contain any branded content. Except for the brand information, both versions of the game were identical.

Players started the game in a virtual living room with a dining table in front of them. To win the game, they had to solve three rounds of puzzles by using differently sized and shaped puzzle pieces that resembled chunks of a (virtual) chocolate bar. Each puzzle consisted of seven pieces, which were arranged on the dining table at the start of each round. By using the hand-held controllers, players could pick up the pieces and place them inside an outline of the puzzle they were completing. In the branded version of the game the outlines contained the chocolate brand's logo. When a puzzle piece was placed correctly it would remain in the outline; an incorrectly placed piece would fall back onto the table. Most players completed the game within 5 minutes.

Measures

Brand Memory

To measure brand memory, a word fragment completion task was used (Rajaram, Srinivas, & Travers, 2001). Twenty minutes after playing one of the two VR games, the participants were asked to complete a set of six incomplete brand names (for example 'R _ _ T E _ _P _ _ T' for 'Ritter Sport') for which the third name was always that of the target brand. Each brand name was shown for 1 second, after which an answer box appeared for the participants to type their answer. Correct completions were coded '1' and incorrect completions with '0' by one of the researchers. About half of the participants (50.6%) correctly completed the name of the target brand.

In line with the research design of this study, an implicit measure for brand memory was chosen to evaluate brand memory rather than an explicit one (like brand recall). This way the effect in the experimental group, that interacted with the brand while playing the

branded VR game, could be compared with a baseline—the control group, that did not interact with the brand but did play a similar VR game.

Presence

A 32-item four-factor presence scale by Witmer et al. (2005) was used to measure presence. The reliability of the factors was checked and three of the four factors proved reliable: involvement (M = 5.28, SD = 0.65, Cronbach's alpha = .79), sensory fidelity (M = 4.68, SD = 1.11, Cronbach's alpha = .64), and immersion (M = 5.83, SD = 0.70, Cronbach's alpha = .77). Correlations between these factors ranged from .32 to .62 and are comparable to those in the original paper—indicating a moderate to strong association between the factors. No index variable was created for interface quality (Cronbach's alpha = .49) due to the poor reliability of the proposed factor.

Perceived Brand Exposure

Serving as manipulation check, participants were then asked to indicate whether they believed to have been exposed to a brand while playing the VR game. They could answer this question with *yes*, *no*, or *not sure*. *Yes* was coded as '1' and both *no* and *not sure* were coded as '0' by one of the researchers.

Results

Manipulation and Randomization Checks

To verify that the manipulation was successful, perceived brand exposure was compared between the experimental and control conditions (10.0%). The results ($\chi^2 = 52.16$, $p < .001$) indicated that in the branded VR condition, significantly more people perceived to have been exposed to a brand (90.0%) compared to the non-branded VR condition (10.0%); meaning that the manipulation was successful.

Moreover, to check whether the sample data were distributed equally across the two conditions, a randomization check was performed with the demographic variables age and sex. No differences were found for age, t (79) = -1.12, p = .312) and biological sex ($\chi^2 = 0.00$, p = .946) between the two conditions—suggesting that the participants were successfully randomly assigned.

Main Analyses

To test both hypotheses, a multiple mediation model (Preacher & Hayes, 2008) was estimated using PROCESS (Hayes, 2013; Model 4) that predicted brand memory. A condition variable was used as independent variable and the three factors of presence were included in parallel as mediators. The model was specified following suggestions by Long and Ervin (2000), with 95% percentile confidence intervals (10.000 bootstrap samples) and heteroscedasticity-consistent standard errors and covariance matrix estimators (HC3). An overview of the results can be found in Table 1.

Table 1
Direct and Indirect Effects Mediation Model Brand Memory

		Brand memory				
Direct effects		*b*	*SE*	*z*	*p*	95% CI
Branded VR game		**0.98**	0.48	2.04	.041	[0.04, 1.92]
Presence	Involvement	- 0.28	0.53	- 0.54	.590	[- 1.31, 0.75]
	Sensory fidelity	0.02	0.25	0.08	.937	[- 0.47, 0.51]
	Immersion	**0.95**	0.48	1.98	.048	[0.01, 1.89]
Indirect effects		*b*	*SE*	*z*	*p*	95% CI
Presence	Involvement	- 0.04	0.12	-	-	[- 0.28, 0.23]
	Sensory fidelity	0.00	0.09	-	-	[- 0.19, 0.19]
	Immersion	**0.32**	0.25	-	-	[0.00, 0.95]

Note. To account for the dichotomous nature of brand memory, z distributions were used rather than t distributions. Regression coefficients in bold are significant.

In line with the predictions, participants who played the branded VR game (65.0%) performed better in the word completion task than those in the VR control game condition (36.6%, $p = .041$). This implies that playing a branded VR game improves players' brand memory and results in better retrieval of the brand name. Additionally, as shown in Table 1, only the presence factor immersion positively mediated the effect of playing the branded VR game on brand memory. Non-significant results were found for involvement and sensory fidelity. In sum, the data supports Hypothesis 1 and partially supports Hypothesis 2.

Discussion

An experiment was conducted to examine the workings of branded VR games in HMD VR and the role of presence in the processing of embedded brand information. The results indicate that playing a branded VR game is positively associated with future retrieval of the brand's name from memory and that immersion experienced from playing a branded VR game strengthens the encoding of this information. Overall, this indicates that branded VR games can be used effectively to communicate brand information.

Presence in a Persuasive Context

When determining the role of presence in a persuasive VR context, the results seem to indicate that only immersion facilitates the processing of brand memory. In other words, immersion experienced from playing a branded VR game seems to drive brand memory.

Even though all four factors of presence were expected to affect brand memory, the current findings could be explained by considering insights from the cognitive capacity model (Lang, 2000). In short, the central theorem of this model suggests that a person's cognitive capacity is limited and that cognitive processes require (and compete for) this finite capacity—similarly to the random-access memory of a computer, its maximum capacity limits the amount of tasks that can (successfully) be performed simultaneously at any single point in time.

Playing a VR game requires players to perform several complex and often cognitively demanding tasks; from interacting with the virtual objects to simply making spatial sense of the simulated virtual space. In other words, when playing a VR game, one's cognitive capacity available for additional cognitive tasks (like successfully processing brand information) is generally believed to be limited. This was demonstrated in a recent study comparing the effectiveness of in-game advertising across various platforms (Roettl & Terlutter, 2018), which reported adverse effects of exposure to brand placements in VR, when compared to desktop and stereoscopic 3D, on overall brand memory.

In line with the cognitive capacity model, a higher accuracy in brand memory could suggest that a player had more cognitive capacity available to process the brand information during the game. From this perspective, the results of the current study could suggest that the increase in immersion from playing a branded VR game is related to the availability of cognitive capacity among player. Future research would be required however to determine whether immersion diminishes the cognitive capacity available to process the VR environment, because the current study design did not allow to test for the causal relationship between presence and cognitive capacity.

Furthermore, the results suggest that involvement and sensory fidelity do not affect brand memory directly. Important to consider however, is that Witmer's conceptualization

of presence (Witmer et al., 2005) and the correlations between the factors of presence, do indicate that sensory fidelity and involvement are related to the players' levels of immersion. This would imply that both involvement and sensory fidelity might influence brand memory indirectly via their relationship to peoples' levels of immersion. Although the current research design does not offer concluding evidence for this relationship, it seems advisable not to ignore the factors involvement and sensory fidelity in future research.

Limitations and Suggestions for Future Research

While this study offers novel insight into the workings of presence in a persuasive context, it does come with some limitations. Foremost, the scale that was used to measure presence did not prove to deliver four reliable factors, as was suggested by the original authors (Witmer et al., 2005). In addition to the borderline reliable measure for sensory fidelity, failing to construct a reliable measure for interface quality might have affected the explanatory powers of the effects of presence. It is possible that interface quality mediated (part of) the effect of branded VR games on brand memory, but since this factor could not be considered in the model this conclusion cannot be drawn with the current data. Besides, it is also possible that, considering that the scale was developed and validated with less modern VR hardware, the items measuring interface quality do not entirely align anymore when measuring presence in an HMD VR context.

Considering that VR technology—and thus the quality of the virtual interface—has improved considerably since Witmer et al. (2005) published their paper, it is not unlikely that the importance of interface quality as a factor for measuring presence has slightly decreased over time. Future research into the effects of presence in a HMD VR context could therefore consider utilizing a different operationalization of presence. A recent study by Tussyadiah et al. (2018) offered an extensive overview of various measures for presence and suggests to use the conceptualization by Wirth et al. (2007) when studying HMD VR. This conceptualization focusses on the dimensions (1) self-location and (2) possible actions to measure presence. Alternatively a shorter and more recent version of their original scale can be used (Hartmann et al., 2016).

Implications for Theory and Practice

The results of this study demonstrate that branded VR games from well-liked brands can positively affect brand memory. Immersion was identified as a possible underlying mechanism for the effectiveness of this type of VR advertising, which could be explained by considering the limited capacity model (Lang, 2000). Note that when compared to previous research into VR advertising, the results seem to suggests that people process VR advertising messages that include brand cues from a single brand (e.g., VR advergames) differently from VR advertising messages that include brand cues from multiple brands (e.g., in-game VR advertising). For both theory and practice it seems

therefore important to consider the amount of brand information that is included in the VR advertising message, for this could potentially influence its effectiveness.

For practitioners, the results show that branded VR games can be an effective tool to promote brand memory. Moreover, it seems that the effectiveness of branded VR games can be improved by fostering a more immersive VR experience. The data indicate that players who were more immersed into the branded VR game were better able to retrieve the brand's name from memory afterwards, implying that immersion facilitated the processing of the brand information while playing. The coherence of sensory stimuli while playing and players' involvement with the virtual experience did not seem to directly influence brand memory.

Concluding Remarks

Considering Musk's prediction that virtual reality will one day become indistinguishable from our reality (Solon, 2016), VR technology and application are likely here to stay. This suggests that for the years to come, investing in and understanding VR will become more important for both the academy and practice. Although today, a perfect union of the virtual and the real still seems far away, the current empirical evidence seems to suggest that the power of modern HMD VR does not necessarily relates to its ability to *look* like reality, but rather to its ability to *feel* like reality.

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