

Repositório ISCTE-IUL

Deposited in *Repositório ISCTE-IUL*:

2024-05-15

Deposited version:

Accepted Version

Peer-review status of attached file:

Peer-reviewed

Citation for published item:

Rodrigues, M. B., Loureiro, S. M. C. & Dias, J. (2023). Cinematic virtual reality: How emotional responses vary across movie genre and technological format. In Timothy Jung, M. Claudia tom Dieck, Sandra Maria Correia Loureiro (Ed.), *Extended reality and metaverse: Immersive technology in times of crisis: XR 2022*. (pp. 265-270). Lisboa: Springer, Cham.

Further information on publisher's website:

10.1007/978-3-031-25390-4_23

Publisher's copyright statement:

This is the peer reviewed version of the following article: Rodrigues, M. B., Loureiro, S. M. C. & Dias, J. (2023). Cinematic virtual reality: How emotional responses vary across movie genre and technological format. In Timothy Jung, M. Claudia tom Dieck, Sandra Maria Correia Loureiro (Ed.), *Extended reality and metaverse: Immersive technology in times of crisis: XR 2022*. (pp. 265-270). Lisboa: Springer, Cham., which has been published in final form at https://dx.doi.org/10.1007/978-3-031-25390-4_23. This article may be used for non-commercial purposes in accordance with the Publisher's Terms and Conditions for self-archiving.

Use policy

Creative Commons CC BY 4.0

The full-text may be used and/or reproduced, and given to third parties in any format or medium, without prior permission or charge, for personal research or study, educational, or not-for-profit purposes provided that:

- a full bibliographic reference is made to the original source
- a link is made to the metadata record in the Repository
- the full-text is not changed in any way

The full-text must not be sold in any format or medium without the formal permission of the copyright holders.

Cinematic Virtual Reality: How Emotional Responses vary across Movie Genre and Technological Format

Mariana Berga Rodrigues ^a,
Sandra Maria Correia Loureiro ^b,
Miguel Sales Dias ^c

^a ISCTE – Instituto Universitário de Lisboa and Business Research Unit (BRU-IUL),
Portugal
mariana.o.b.rodrigues@gmail.com

^b ISCTE – Instituto Universitário de Lisboa and Business Research Unit (BRU-IUL),
Portugal
sandramloureiro@netcabo.pt

^c ISCTE – Instituto Universitário de Lisboa, ISTAR, Portugal
miguel.dias@iscte-iul.pt

Abstract

The current study seeks to explore whether virtual reality (VR) can be more effective than traditional 2D in influencing emotional responses (namely, empathy and sympathy) considering different movie genres. A factorial design 2 (movie genre: animation; documentary) x 2 (VR; 2D) between-subjects experiment was employed. A total of 145 participants were recruited. Findings suggest that sympathy and empathy responses to movies are affected by the technological format used to experience a movie, being higher in VR than in 2D. Regarding sympathy, the conducted analysis suggests that the movie genre has a higher impact than the format. Additionally, the present study concludes that the interaction between technological format and movie genre has a significant impact on WOM.

Keywords: virtual reality; cinematic virtual reality; empathy; sympathy; WOM; motion picture.

Introduction

Movies have a narrative potential that allows individuals to understand personal and societal issues. Considering the high-risk investment on movie production, the narrative and marketing efforts are decisive factors to the success in the box office. As Kerrigan (2018) argues, movies' importance lay in their ability to tell myths, despite the technology used to do so. However, even though the narrative is determinant, technology has always played a major role in the motion picture industry since the beginning of cinema (Eliashberg, Elberse & Leenders, 2006).

Virtual reality (VR) represents the construction or use of a virtual world where users feel immersed as if they were part of that environment (Loureiro et al., 2019; Loureiro, Bilro, & Angelino, 2020; Loureiro, Correia, & Guerreiro, 2022). At the core of a VR immersive experience is the empathy factor (Shin, 2018; Rodrigues &

Loureiro, 2022). Empathetic responses are often considered by screenwriters and film critics the ultimate experience a spectator can have from a movie. Therefore, considering the multisensory stimuli the technology can provide, there has been a high investment in VR in the motion picture industry. Yet cinematic virtual reality is still at an early stage and the literature is scarce on how consumers will perceive it.

Our study gives a contribution to the literature by exploring how emotional responses vary across technological mediums (2D and VR), considering different movie genres (documentary and adventure). Additionally, we seek to understand how emotional responses influence word-of-mouth (WOM), a determinant brand attitude regarding consumers consumption decisions of movies (Angelino, Loureiro, & Bilro, 2021; Loureiro, Guerreiro, & Japutra, 2021; Yoon et al., 2017).

Literature Review

The first forms of cinema were more concerned with the display itself than with the narrative due to the curiosity for the device (Kerrigan, 2018). However, as filmmakers progressed, the attention turned to narrative engagement. The way humans process narratives is similar to how they process and interpret their experiences. Narratives can strengthen emotional connections, stimulate imagination, memories, passion, and contributes to confer sense to the world (Laer et al., 2018; Loureiro, 2020).

Ross (2020) explains that VR can provide processes that create a more direct experience of the movie to the spectator and can even heighten empathy in the audience. According to Rooij (2019), and regarding the motion picture industry, sympathy requires some sort of supportive emotion for a character and comprehension for the events in the narrative. However, sympathy is a more distanced feeling than empathy. Empathy is a stronger emotional response and, therefore, a key element when examining the emotional relationship between the spectator and the fictional characters (Escalas & Stern, 2003; Loureiro, Guerreiro, & Ali, 2020). Different mediums can enhance transportation differently (Anaza et al., 2019). According to Shin and Biocca (2017), VR viewing and interaction improve users' engagement and are positively associated with consumers' experience of empathy. Therefore, it would be relevant to understand how the technology affect consumers' empathy and sympathy comparing with 2D traditional screens. On this basis and considering the existent literature the following hypotheses are proposed:

H1: There is an interaction effect between technological format (2D or VR) and movie (documentary and animation) on sympathy

H2: There is an interaction effect between technological format (2D or VR) and movie (documentary and animation) on empathy

The motion picture industry is a risky venue (Eliashberg, Hui, & Zhang, 2007). The failure of a movie regarding box office performance can have a high negative financial impact on movie studios, even major ones (Eliashberg, Hui, & Zhang, 2007). Movie genre is an important determinant of movie consumption decisions by the audience. Movie genre preferences is also positively related to consumer personality and lifestyles (Desai & Basuroy, 2005). Further, as literature contends, both positive and negative WOM plays a crucial role in determining moviegoers' consumption decisions as it allows consumers to evaluate the quality of a movie even before watching it. In fact, WOM can be decisive of a movie's success, considering that

positive WOM can lead to a greater audience watching the movie and, therefore, greater box office performance (Yoon et al., 2017; Craig, Greene, & Versaci 2015). Therefore, considering the expectations but also the limitations and challenges CVR has, the following hypothesis is suggested:

H3: There is an interaction effect between technological format (2D or VR) and movie (documentary and animation) on WOM.

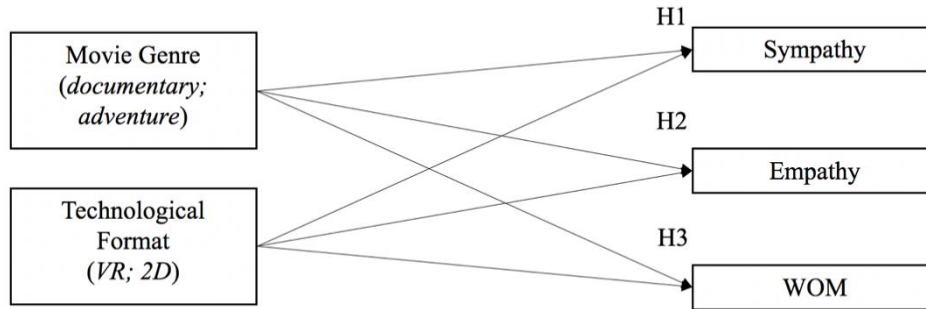


Fig. 1. Conceptual Model

Methodology

This study followed a factorial design 2 (movie story: documentary, animation) x 2 (technology format: 2D, VR) between-subjects experiment. The dependent variables are sympathy, empathy and WOM. We decided to use two existing movies in order to increase this study's ecological validity. The movies chosen for this research have VR and 2D counterparts' available. Two different movie genres were considered: animation and documentary. As research contends (Wehrmann & Barros, 2017), a single movie can be labelled with multiple genres. In this case, the two movies selected for this study (*Is Anna Ok?* and *Crow: The Legend*) are also short movies that were computer generated. The 2D counterparts are available on YouTube, and the VR version was downloaded to be experienced with the Oculus Rift headset device. The experiment consisted of two groups of participants: the control group (experienced the movies in 2D) and the experimental group (experienced the movies in VR). A total of 145 participants were recruited (78 in the control group).

Results

The two-way ANOVA was applied to test the hypotheses H1, H2 and H3 through the test of Between-Subjects effect (see Table 1). Regarding H1, we accept the null hypothesis and conclude that the independent variables and their interaction do not have a significant effect ($F_{(1, 141)}=2.366$, $p=.126$) on sympathy. Thus, H1 is not supported. However, considering the independent Format, there is a statistically significant difference ($p = 0.02$), meaning that Format has a significant effect on the dependent sympathy. The same occurs with the independent Movie. A similar situation is observed to the interaction effect of technological format and movie genre on empathy ($F_{(1,$

$t_{(141)}=2.656, p <.05$) is significant and so H2 is not supported (only the single effects are significant). Regarding the variable WOM, the interaction effect of technological format and movie genre is significant ($F_{(1, 141)}=16.623, p <.05$) supporting H3. According to the Partial Eta column, 10.5% of the variance in WOM can be attributed to the interaction between Format and Movie Genre.

Table 1. Tests of Between-Subjects Effects for Sympathy, Empathy and WOM

Source		Df	Mean Square	F	Sig.	Partial Eta Square
<i>Sympathy</i>						
Corrected Model		3	6.667	8.305	.000	.150
Format		1	8.242	10.267	.002	.068
Movies		1	10.804	13.459	.000	.087
Format*Movies		1	1.899	2.366	.126	.017
Error	113.187	141	.803			
Total	5453.667	145				
Corrected Total	133.188	144				
<i>Empathy</i>						
Corrected Model		3	66.757	34.333	.000	.422
Format		1	182.550	93.885	.000	.400
Movies		1	20.561	10.574	.001	.070
Format*Movies		1	5.164	2.656	.105	.018
Error	274.161	141	1.944			
Total	3043.444	145				
Corrected Total	474.432	144				
<i>WOM</i>						
Corrected Model		3	82.150	43.122	.000	.478
Format		1	180.739	94.874	.000	.402
Movies		1	52.742	27.686	.000	.164
Format*Movies		1	31.668	16.623	.000	.105
Error	268.612	141	1.905			
Total	3648.000	145				
Corrected Total	515.062	144				

Conclusions

Sympathy and empathy responses to movies are affected by the technological format used to experience a movie, being higher in VR than in 2D. However, the effect of the technological format was greater in empathy responses than in sympathy responses. In fact, regarding sympathy, the conducted analysis suggests that the movie story has a higher impact than the format. By the way of contrast, the format in which a movie is presented affects empathy more than the movie story. Thus, VR affects humans' perceptions and cognitive levels (Shin, 2018).

Additionally, this study concludes that the interaction between technological format and movie genre has a significant impact on WOM. Considering both

independents individually, it can be stated that even though both movie genre and technological format have a significant effect on WOM, the variable is more influenced by the technological format than by the movie genre. Moreover, we can also observe that both movies had higher scores for WOM in VR, thus, investing in VR techniques can contribute to positive WOM of a movie.

This research contributes to theory by exploring how VR differs from traditional 2D screens regarding constructs that reflect consumer behavior aspects (namely, empathy and sympathy). In addition, regarding the managerial implications, although movies are a highly profitable industry, it is also a risky venue due to the high costs associated. WOM can be a determinant factor movie consumption. Therefore, studios and movie producers should invest in movies that motivate positive WOM by carefully selecting and preparing the story and gradually prefer the VR over the 2D. The story should fit with the personality and identity of the target audience. As our findings suggest, the technologic format can also create a difference and VR tends to be more appealing than 2D.

References

- Anaza, N.A., Kemp, E., Briggs, E., & Borders, A.L. (2019). Tell me a story: The role of narrative transportation and the C-suite in B2B advertising. *Industrial Marketing Management*, 89, 1-14. DOI: [10.1016/j.indmarman.2019.02.002](https://doi.org/10.1016/j.indmarman.2019.02.002)
- Angelino, F., Loureiro, S.M.C., & Bilro, R.G. (2021). Exploring Tourism Students' Engagement through Telepresence, Pleasantness of the Experience and Memory: A Virtual Reality Approach. *Journal of Promotion Management*, 28(5), 669-685. doi: [10.1080/10496491.2021.2009614](https://doi.org/10.1080/10496491.2021.2009614)
- Craig, C.S., Greene, W.H., & Versaci, A. (2015). E-Word of Mouth: Early Predictor Of Audience Engagement. *Journal of Advertising Research*, 55(1), 62-72. <https://doi.org/10.2501/JAR-55-1-062-072>
- Desai, K.K. & Basuroy, S. (2005). Interactive Influence of Genre Familiarity, Star Power, and Critics' Reviews in the Cultural Goods Industry: The Case of Motion Pictures. *Psychology & Marketing*, 22(3), 203-233. <https://doi.org/10.1002/mar.20055>
- Eliashberg, J., Hui, S.K. & Zhang, J. (2007). From Story Line to Box Office: A New Approach for Green-Lighting Movie Scripts. *Management Science*, 53(6), 881-893. <https://doi.org/10.1287/mnsc.1060.0668>
- Eliashberg, J., Elberse, A. & Leenders, M. (2006). The Motion Picture Industry: Critical Issues in Practice, Current Research, and New Research Directions. *Marketing Science*, 25(6), 638-661. <https://doi.org/10.1287/mksc.1050.0177>
- Escalas, J. E. & Stern B.B. (2003). Sympathy and Empathy: Emotional Responses to Advertising Dramas. *Journal of Consumer Research*, 29, 566-578. <https://doi.org/10.1086/346251>
- Laer, T., Visconti, L.M. & Feiereisen, S. (2018). Need for narrative. *Journal of Marketing Management*, 34(5), 484-496. <https://doi.org/10.1016/j.jbusres.2018.10.053>
- Loureiro, S. M. C. (2020). Managerial Challenges and Social Impacts of Virtual and Augmented Reality (pp. 1-280). Hershey, PA: IGI Global. doi:10.4018/978-1-7998-2874-7
- Loureiro; S.M.C, Bilro, R. G., & Angelino, F. J. A. (2020). Virtual reality and gamification in marketing higher education: a review and research agenda. *Spanish Journal of Marketing* doi: 10.1108/SJME-01-2020-0013
- Loureiro, S.M.C., Correia, C., & Guerreiro, J. (2022). Mental Imagery, Product Involvement and Presence at Virtual Reality Supermarket. *Journal of creative communications* (published online 27April 2022) doi: 10.1177/09732586221086655

- Loureiro, S.M.C., Guerreiro, J., & Ali, F. (2020). 20 years of research on virtual reality and augmented reality in tourism context: A text-mining approach. *Tourism Management*, 77, 104028. doi: [10.1016/j.tourman.2019.104028](https://doi.org/10.1016/j.tourman.2019.104028)
- Loureiro, S.M.C., Guerreiro, J., Eloy, S., Langaro, D., & Panchapakesan, P. (2019). Understanding the use of Virtual Reality in Marketing: A text mining-based review, *Journal of Business Research*, 100, 514-530. <https://doi.org/10.1016/j.jbusres.2018.10.055>
- Loureiro, S.M.C., Guerreiro, J., & Japutra, A. (2021). How escapism leads to behavioral intention in a virtual reality store with background music?. *Journal of Business Research*, 134, 288-300. doi: 10.1016/j.jbusres.2021.05.035
- Mateer, J. (2017). Directing for Cinematic Virtual Reality: how traditional film director's craft applies to immersive environments and notions of presence. *Journal of Media Practice*, 18(1), 14-25. <https://doi.org/10.1080/14682753.2017.1305838>
- Rodrigues, M. & Loureiro, S.M.C. (2022). Virtual Reality in the Motion Picture Industry: The Relationship among Movie Coolness, Sympathy, Empathy, and Word-of-Mouth. *Journal of Promotion Management*, 28(2), 144-159. doi: [10.1080/10496491.2021.1987964](https://doi.org/10.1080/10496491.2021.1987964)
- Rooij, M. (2019). Carefully Constructed Yet Curiously Real: How Major American Animation Studios Generate Empathy Through a Shared Style of Character Design. *Animation: an interdisciplinary journal*, 14(3), 191-206. <https://doi.org/10.1177/1746847719875071>
- Ross, M. (2020). Virtual Reality's New Synesthetic Possibilities. *Television & New Media*, 21(3), 297-314. <https://doi.org/10.1177/1527476418805240>
- Shin, D. (2018). Empathy and embodied experience in virtual environment: To what extent can virtual reality stimulate empathy and embodied experience?. *Computers in Human Behavior*, 78, 64-73. <https://doi.org/10.1016/j.chb.2017.09.012>
- Shin, D. & Biocca, F. (2017). Exploring immersive experience in journalism. *New media & Society*, 20, 2800-2823. <https://doi.org/10.1177/1461444817733133>
- Kerrigan, F. (2017). Movies. *Consumption Markets & Cultures*, 21(5), 503-509. <https://doi.org/10.1080/10253866.2017.1306207>
- Yoon, Y., Polpanumas, C., & Park, Y.J. (2017). The Impact of Word of Mouth via Twitter on Moviegoers' Decisions and Film Revenues. *Journal of Advertising Research*, 57(2), 144-158. <https://doi.org/10.2501/JAR-2017-022>