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WHEN THE PROTEUS EFFECT STIMULATES 3D MMORPG PLAYERS TO BUY...

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Abstract: The aim of this research is to identify and understand the reasons why players purchase virtual items (VI) in the virtual reality (3D) MMORPG. From the results of a sample of 567 players, two important theoretical elements emerge. First, the theoretical model highlights the mechanisms leading to VI purchase by drawing on the theoretical underpinnings of projective identification (Klein, 1946) and the Proteus effect (Yee and Bailenson, 2007) to demonstrate the strong influence of the avatar on player attitudes and behaviour in 3D multiplayer online worlds. Secondly, the results of our study provide a unified theoretical view by shedding light on the combined effects of the three constructs underlying the two previously mentioned theories, namely: embodiment, community engagement and sense of belonging. In addition, our research outlines managerial implications along two axes to help professionals develop more effective solutions in the future.

Keywords: MMORPG, virtuals items, embodiment, Proteus effect, community engagement, sense of belonging, projective identification

Introduction

Taking advantage of the recent boom in virtual reality technology, the video game market, and more specifically the 3D MMORPG (Massively Multiplayer Online Role Playing Game) segment, is experiencing good growth prospects, with an average rate of 30% per year since 2020¹. Currently, nearly 20 million players around the world play daily in these virtual multiplayer environments². For MMORPG publishers, the search for profitability and profitability remains a major issue (Garnier and Prostack, 2015) and involves the implementation of a system for monetising virtual objects (Nojima, 2007; Lehdonvirta, 2009), which can be carried out in particular per unit or in the form of a loot box (Tan and Yang, 2022). Lehdonvirta (2009) defines a virtual object (VO) as a mass-produced product that is bought and sold in the same way as a conventional object; these virtual objects include items, characters and currencies in multiplayer and other online games. In these new 3D virtual games, OV purchases are increasingly used by players to equip their avatars. Throughout the game, the purchase of OV then becomes a constructed, symbolic and emotionally charged consumption (Kamel and Bricmont, 2011). Consequently, understanding the mechanisms that encourage players to buy OVs is becoming a growing field of investigation among the research and professional communities.

Most of the research dealing with the purchase behaviour of MMORPG players focuses both on the evaluation of individual variables, through approaches centred on the motivations for online play or oriented towards attachment to OVs (Garnier and Poncin, 2013 ; Garnier and Prostack, 2015; Tan and Yang 2022), and on the analysis of situational variables focused on immersion and flow generated by the game (Csikszentmihalyi 1990; Volle and Charfi, 2013; Degorre and Galan 2013; Degorre, Galan and Girau, 2015)³. Unfortunately these studies are mainly developed in the context of two-dimensional MMORPG games and to our knowledge few studies have analysed the process that leads to OV purchase in the world of MMORPGs in the context of 3D gaming. Nevertheless, the vast majority of these studies have been conducted in 3D MMORPGs, displayed on a computer screen. Thus, very little is currently known about the influence of recent virtual reality MMORPGs on player's VIs purchase behaviour. Traditionally, virtual reality is considered a digital environment in which the individual is fully immersed through the use of artefacts such as stereoscopic vision, tracking level and image quality (Cummings & Bailenson, 2016). In addition, these different technological affordances

¹ Internet source: www.realite-virtuelle.com/chiffres-vr-2021/, accessed on 13.10.2022

² Internet source: www.philomag.com/articles/mmorpg-le-grand-jeu, accessed on 26.08.2022

³ For a review of all of these variables that affect in-game virtual object purchase behaviour, see the meta-analysis by Cummings et al (2015)

allow the player to evolve in the virtual reality game by truly embodying his virtual avatar. In light of this observation, several research questions emerge:

RQ1. How does the process of embodiment, enabled by virtual reality, influence the relationship of the individual to the individual's avatar ?

RQ2. Does this virtual embodiment have an impact on the player's sense of community and community engagement ?

RQ3. Is purchasing behaviour impacted by these communities that are generated through these new virtual reality worlds ?

Whatever the typology of MMORPG (2D or 3D), the individual enters this virtual imaginary world through the use of an avatar, a virtual character, fixed or animated, of the user and defined as the graphic representation of the real player (Garnier and Poncin, 2013). However, a major difference remains in the game experience proposed between a 2D and 3D MMORPG. Indeed, the virtual reality (3D) mechanism generated by the device worn on the player's head (VR headset), offers him/her a tenfold immersion by means of a gesture modelled in real time in the digital game. According to the theory of projective identification (Klein 1946), the more the individual can project characteristics of the self (attitudes and behaviour) into the object, the more he will be able to identify with it. By extension, the more the player will have the feeling of embodying his avatar through the multiplayer online game, the higher his involvement in the game will be. Thus, with the intimate conviction of "being there" (Heeter, 1992; Slater and Wilbur, 1997) in the virtual universe, embodied by his digital companion (his avatar), the individual transcended by his virtual companion will be totally immersed and present in it, thus totally forgetting the meanderings of the real world and literally indulging in the pleasure procured by the game and by his "perfect virtual double" (Garnier and Poncin, 2013). Through this embodiment construct, numerous studies aimed at understanding its mechanisms highlight agentivity and possession as two fundamental antecedents characterising this concept (Argelaguet et al, 2016; Blanke and Metzinger, 2008; Roth et al, 2021). Consequently, a strong identification of the individual with his or her avatar is likely to result in Yee and Bailenson's (2007) Proteus effect. According to the theory of the Proteus effect, the individual, through his avatar, will unconsciously adjust his behaviour according to, on the one hand, the identity influence generated by the virtual appearance of his digital character by taking an observer position (Bem, 1972; Péna et al, 2009; Fox, Bailenson & Tricase, 2013) and on the other hand, the perception that other players have of him given the virtual personality of his avatar (behavioural confirmation principle - Yee & Bailenson, 2007; Guegan, Buisine &

Collange, 2017). In other words, by identifying deeply with one's virtual character, the real identity of the individual will fade over time, to the benefit of the idiosyncratic personality of the avatar and its role in the virtual community. From then on, in a deep desire to form close ties with other members of the group, the individual will actively engage in the community by providing the skills and performance of his or her avatar to succeed in team quests and missions (Lu et al, 2019). Over time, community engagement creates a strong sense of belonging for the individual to their community. Therefore, in this world where the individual embodies himself through his avatar to identify more with it and his community, he is necessarily led to purchase virtual objects. The originality of this article lies in the mobilisation of these two theoretical foundations: projective identification through embodiment and the theory of proteus on the intention to purchase virtual objects in the context of the 3D MMORPG, which has not yet been done to our knowledge.

Through this paper, we highlight the combined effect of embodiment on the sense of belonging, on community engagement and by mediation effect on the intention to purchase OV from players in VR MMORPGs. The results of the test of the theoretical model on a sample of 567 players of the game Zenith: "The Last City" contribute on two levels. Academically, it is one of the few studies to our knowledge that allows us to understand the purchase of virtual objects in the world of 3D multiplayer games. On a managerial level, this article provides game publishers, and more specifically managers and developers, with development paths aimed at designing more immersive and highly community-based game solutions aimed at encouraging the player to purchase VPOs to further customise his avatar. This article will first discuss the theoretical framework based on the main theories mentioned above with the research hypotheses derived from them. Then, the methodology of the study and the presentation of the results obtained will be presented. Finally, the contributions, limitations and perspectives of the research will be discussed.

Literature review and conceptual framework

The impact of agentivity on community engagement, sense of belonging

According to Kilteni et al (2012), the sense of embodiment can be defined as follows: "the sense of embodiment towards a body B is the sense that emerges when the properties of B are treated as if they were the properties of one's own biological body". Agentivity, a component of embodiment, corresponds to the individual's sense of being the author of the action. (Slater et al, 2010). More specifically, agentivity combines aspects of intention, motor selection,

action, and final control of movement (Kilteni et al, 2012). In fact, the higher the sense of agency, the more the individual will have the feeling of being fully present in the virtual game and ultimately of being an actor in its community. In their work on agentivity, Ayed and Dorta (2021) have shown that a strong sense of agency increases team spirit, exchanges and creativity within a group of individuals. Therefore, we formulate the following hypothesis:

H1(a): Agentivity positively influences player community engagement.

In their 2012 work, Kim et al showed that a strong identification of the individual with their avatar increases the feeling of trust towards the group and by extension the feeling of belonging. The reinforcement of this identification is made possible, in our view, through the agentivity mechanism. Thus we pose the following hypothesis:

H1(b): Agentivity positively influences the player's sense of community

The impact of ownership on community engagement, sense of belonging

Kilteni et al (2012) define ownership, the second component of the sense of embodiment, as the attribution of a virtual self to one's own body. In reality, for embodiment to be complete, the individual must necessarily feel that they are the main subject of the virtual character. In MMORPGs, the avatar, which represents a user, is defined as a virtual character driven by human behaviour (Kilteni et al, 2012). By extension, a strong sense of ownership of the avatar ineluctably engenders the feeling of being fully present in the community as a salient virtual individuality (virtual personalities and physical characteristics of the avatar - Garnier and Poncin, 2013), able to exert specific influence within the group, satisfy individual needs and share common interests (Wu, Chen and Chung, 2010). Thus, we hypothesize the following:

H2(a): Ownership positively influences player's community engagement.

Over time, the avatar becomes stronger and stronger and the bond with the player becomes closer and closer. According to Watkins and Molesworth (2012), the greater the individual's sense of ownership of the avatar, the greater his or her attachment to the avatar and the greater his or her virtual identity projection within the gaming group. Thus, thanks to his avatar, the player occupies a place of choice in his virtual community, accentuating a strong positive identification process towards it (Guegan, Moliner and Buisine, 2015) and ineluctably

implying a modification of his real attitudes and behaviour in favour of the group's expectations (Yee, Bailenson and Ducheneaut, 2009). With this in mind, we submit the following hypothesis;

H2(b): Ownership positively influences the player's sense of community.

The impact of community engagement and sense of belonging on the player's intention to purchase virtual items to help their community.

In the MMORPG universe, the virtual community is a real communication platform through which different members interact with each other to develop game strategies, progress, develop friendships and share common interests (Wu, Chen and Chung, 2010). Moreover, the desire to improve one's status, skills, create social bonds and have fun are important antecedents in an individual's search for a sense of community (Tonteri, Kosonen, Ellonen and Tarkiaine, 2011). Indeed, directly related to the Proteus effect, the roles (status and skills of the player in the clan) possibly played by the individual through the appearance and identity reflection of his avatar within the group, encourage him to enroll in a VI acquisition process in order to further explore and assert his virtual self (Parmentier and Roland 2009). In this same extension, the work of Belaud, Heitz-Spahn and Yildiz (2016) reveals that the influence of the community linked to the spirit of competition and the place occupied by the player with his group, positions him in a state of perseveration inciting him to continually purchase OV's to maintain his level in the game. Finally, in their work on virtual communities, Kim et al (2012) revealed that a strong identification with the community generates a favourable attitude towards the exploitation of virtual universes and by extension the purchase of OV's. In this regard, we put forward the following hypothesis:

H3(a): Community engagement positively influences player purchase intentions to support their gaming community.

Furthermore, according to Chavis and Newbrough (1986), a community is built on social relations linked by a strong sense of community, of belonging, which stimulates, in particular, games of influence, satisfaction and adhesion between the different members. In the case of MMORPGs, this same sense of belonging encourages individuals to form or join salient virtual communities in this cyberspace with strong norms, values and stereotypes and very often modifying the individual's behaviour (Péna and Blackburn, 2013). Dumazert (2017) has shown in particular that the purchase of OV's allows the avatar to be equipped according to the group's

norms and inexorably reinforces its sense of belonging. Furthermore, in their work on the effects of community feeling, Yahia and Chaabouni (2015) argued that a strong sense of community belonging strongly increases the purchase intentions of group members to actively participate in the life of the community. Like community involvement, the sense of belonging is also closely related to the Proteus effect and more specifically to the de-individuation mechanism it engenders. Indeed, the anonymity offered by the avatar makes the individual more likely to buy OVs in order to assert an "avatarised" personality that is normalised to the community's expectations. Moreover, Hassounh and Brengman (2011) have shown that the issue of acceptance by the community and the response to members' demands are two important levers in the intention to purchase in virtual worlds. Hence the following hypothesis:

H3(b): Sense of belonging positively influences the player's purchase intentions to support their gaming community.

Methodology and results

Procedure.

The conceptual model and resulting hypotheses were tested with players of the game Zenith: "The Last City". This is a VR MMORPG game released in January 2022 where players play and contribute to the improvement of this early version. The questionnaire was posted on several forums between February 2022 and September 2022. We collected 751 responses, of which 567 were validated. The concepts and constructs of agentivity, possession in relation to the game, sense of belonging to the group, commitment to the gaming group and intention to purchase virtual goods to further contribute to the performance of the game in the group were measured using measurement scales from the literature via a 7-point Likert scale. The model was estimated using structural equations. Data analysis was carried out using SPSS v28 and AMOS v26 software (table 1-2-3).

2.2. Results.

The results from the principal component analysis (PCA) and the use of structural equations show that the agentivity and possessions variables have a positive and significant impact on the sense of belonging and community involvement. Thus, the hypotheses H1(a),

H1(b), H2(a) and H2(b) of our conceptual model are validated (H1(a): $\beta = 0.210$, and $p < 0.001$; H1(b): $\beta = 0.273$ and $p < 0.005$; H2(a): $\beta = 0.238$ and $p < 0.001$; H2 (b): $\beta = 0.273$, and $p < 0.001$). Furthermore, it is clear that agentivity has a more significant impact on the sense of belonging and community involvement than possession (Table 4). Furthermore, purchase intentions are positively impacted by community involvement and sense of belonging. This allows us to validate hypotheses H3(a) and H3(b) (H3(a): $\beta = 0.244$ and $p < 0.001$; H3(b): $\beta = 0.121$ and $p < 0.005$). Finally, our results highlight the mediating effect of community involvement and sense of belonging between the independent variables of agentivity and possession and the dependent variable of intention to purchase OV (Table 4). In addition, the mediating effect is stronger for community involvement than for sense of belonging (Table 4). (table 4).

Discussions, contributions, limitations and future research.

Discussions.

This study confirms the combined impact of the three constructs of embodiment, community engagement and belonging, on the purchase intentions of the player evolving in a virtual reality MMORPG. As such, this research complements studies confirming the impact of the feeling of embodiment on the intentions to visit tourist destinations among participants experiencing virtual reality (Caspar et al., 2015; Marasco et al., 2018; Pasanen et al., 2018; Leveau and Camus, 2022), by demonstrating more globally the multiple assets of the feeling of embodiment on the behaviour of the individual in these new digital worlds. Moreover, as the player is part of a virtual identity construction dynamic correlated to the expectations of his community, our study highlights the important role played by the avatar in OV purchase intentions. This research finding is in line with the Proteus effect of Yee and Bailenson (2007) and complements it.

Theoretical and practical implications.

More generally, in terms of theoretical contributions, the originality of this research lies at three levels. Firstly, to our knowledge, no research has tested this combination of hypotheses in a virtual reality game environment. Consequently, our model sheds light on a multifactorial mechanism that is still little analysed in academic research on this new theme. Moreover, rooted in the taxonomies of Dix (2017) and Flavián *et al.* (2019), our study of virtual reality worlds

complements and supports the idea that embodiment is an essential and characteristic dimension of these new technological worlds. Secondly, our study is, in our opinion, the only one to highlight the impact of the Proteus effect on player purchasing behaviour in a 3D MMORPG. In fact, a significant number of studies on the Proteus effect only focus on the mutation and identity exploration effects offered by the avatar. Third, the model highlights a possible new convergence of several theoretical foundations related to player purchase behaviour, namely the complementarity of the Proteus effect theory (Yee & Bailenson, 2007), the theory of virtual community sense (Blanchard & Markus, 2004; Blanchard, 2007) and the concept of embodiment (Kilteni *et al.*, 2012).

As far as the managerial implications are concerned, the results suggest two main operational axes. The first is instrumental, with a need for professionals to design and improve their game solutions by proposing more dynamic and immersive technologies in order to increase individuals' sense of embodiment and presence in the game, thus accentuating their role as privileged actors interacting with the members of their virtual community. The second axis has a psycho-sociological hue, directing the MMORPG's editors towards the interest of supporting strong links between players to consolidate solidarity and cooperation between them, thanks to the creation of more engaging community interfaces through team challenges (Lowe and Johnson, 2017), competitions between guilds and active, fluid audio chat systems. Furthermore, editors should develop exclusive social networking platforms specially dedicated to these new virtual reality games in order to encourage players to maintain their links even outside the game phases and strengthen attachment to the game and participatory cultures (Bugress and Jones, 2020). This will eventually strengthen the community tribalism of players with regard to the game and their community and thus encourage, on the one hand, players' repeated immersion and purchase in these new multiplayer game worlds and, on the other hand, positive word-of-mouth towards these games (Badrinarayanan *et al*, 2014)

Limitations and future research.

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the model highlights a new possible convergence of several theoretical foundations related to player purchase behaviour, namely: the complementarity of the Proteus effect theory (Yee and Bailenson, 2007), the virtual community feeling theory (Blanchard and Markus, 2004; Blanchard, 2007) and the embodiment concept (Kilteni et al, 2012). In terms of managerial implications, the results suggest two main operational axes. The first axis is instrumental, with the need for professionals to design and improve their game solutions by proposing more dynamic and immersive technologies in order to increase the individual's sense of embodiment and presence in the game, thus accentuating his or her role as a privileged actor with the members of his or her virtual community. The second axis has a psycho-sociological dimension, by orienting publishers towards the interest of supporting strong links between players to consolidate solidarity and cooperation between them, thanks to the creation of more engaging community interfaces through team challenges, competitions between guilds and active audio chat systems.

However, despite the interesting information on the possible explanatory variables of purchase intentions of virtual goods in a 3D MMORPG, there are some limitations to our research. First of all, as previously mentioned, our model concerns an early game. Thus, this embryonic aspect of the game can necessarily lead to alterations in the results. In other words, the impact of the variables of the model analysed may evolve as the gameplay of the game becomes more sophisticated. Secondly, our model is based on declarative data that may call into question its external validity. It might be relevant to conduct this same study on another more mature virtual reality MMORPG, in order to confirm our results. Other future avenues of research remain to be explored in order to gain a deeper understanding of the purchasing behaviour of players in these virtual reality environments. In this respect, communities bring together many personalities with varying motivations. It could therefore be interesting to analyse the impact of members' personal motivations according to Yee's taxonomy (2007) on community involvement, and ultimately on purchase intention. Another research perspective would be to measure the impact of the clan leader on the nature of the individual's community commitment and sense of belonging with regard to the leadership continuum theory (Tannenbaum and Schmitt, 1958). Furthermore, as the avatar is intimately linked to the individual, the attachment to its virtual companion could influence its behaviour towards the community by limiting or reinforcing its personal involvement. In this respect, examining the impact of this attachment on the variables of community involvement and belonging may be a third relevant avenue for understanding the formation of purchase intentions. A fourth avenue

of research could focus, following the example of Guadagno, Swinth and Blascovich's (2011) work on social evaluation in virtual environments, on assessing the impact of the avatar's appearance on the integration of the individual by other members of the community, and thus on the extent of his community commitment and his sense of belonging to his group. Finally, these multiplayer online games are directly mediated by computer or virtual reality headset. The degree of involvement of the individual in the game, and consequently their level of engagement in their community, is inextricably linked to their perception of the usefulness and ease of using this technology. Thus, understanding and measuring the effects of the TAM (Technology Acceptance Model - Davis et al, 1989) on community engagement and purchase intention could be a fifth and final area of research.

Conclusion

The rise of the metaverse and new technologies is overturning the existing economic ecosystem. Virtual reality (VR) is reshaping the landscape of virtual worlds by offering highly immersive, collaborative 3D universes that promote pleasure in the use of these new digital information systems (Van der Heijden, 2004). This powerful community involvement necessarily leads individuals to buy OVs to express a strong sense of belonging to this same virtual community. These OV purchases are a godsend for BMs, which are tending to become business models no longer based on the sale of subscriptions but on the monetization of individual OVs.

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Figure1: Conceptual model and research hypotheses

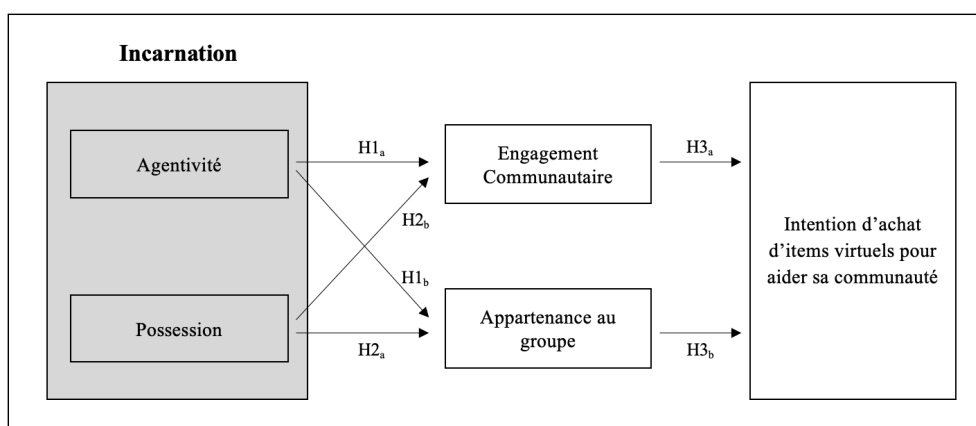


Table1. Demographic analysis results

Classification		Frequency	Percentage of Percentage
Gender	Male	485	85.52
	Female	82	14.48
Age	Under 12	12	2.2
	13-15	79	13.96
	16-18	287	50.61
	19-21	140	24.73
	22-24	36	6.44
	25-27	7	1.3
	28-30	2	0.36
	Over 30	1	0.29
Education	Without diploma	54	9.6
	College certificate	226	39.99
	Middle-school certificate	169	29.86
	Middle-school certificate +1	36	6.36
	Middle-school certificate +2	47	8.39
	Bachelor	22	3.69
	Master	8	1.23
	Doctorate	5	0.72

Table2: The discriminant validity based on Fornel Larker Criterio

Variables	Mean	AVE	IA	Agentivity	Possession	Group membership	Behavioral Commitment
IA	4.000	0.581	0.762				
Agentivity	4.487	0.755	0.152**	0.869			
Possession	4.162	0.460	0.163**	0.252**	0.678		
Group membership	4.857	0.749	0.058	-0.056	-0.090*	0.865	
Behavioral Commitment	4.318	0.464	0.223**	0.329**	0.277**	-0.178**	0.681

** Correlation is significant at the 0.01 level.

* Correlation is significant at the 0.05 level.

Table3. Discriminant Validity and Reliability

Buildings	Alpha Cronbach	AVE	KMO	Sig
Possession	0.78	46.028	0.855	0.000
Agentivity	0.84	75.513	0.713	0.000
Group membership	0.72	74.930	0.500	0.000
Behavioral commitment	0.76	46.410	0.825	0.000
Intention to purchase virtual items	0.72	58.130	0.540	0.000

AVE: average variance explained; Sig: significance

Table 4. Synthesis of the significant model's estimation relationships

Variable relationships		Estimate	H.E.	C.R.	Sig
Studied variables					
Agentivity	Group membership	0.238	0.040	5.867	***
Possession	Group membership	0.127	0.047	2.710	**
Agentivity	Behavioral commitment	0.273	0.038	7.112	***
Possession	Behavioral commitment	0.210	0.038	5.493	***
Group membership	IA	0.121	0.046	2.615	**
Behavioral commitment	IA	0.244	0.049	5.023	***
Control variables					
Age	Possession	-0.144	0.053	-2.690	**
Age	Behavioral commitment	0.124	0.048	2.595	**

***: Significant at 1%; **: Significant at 5%.