

The Experiences of Self-Extension, Archetypes, and Motivations in MMORPG Online Games: An Analysis of Brazilian World of Warcraft Context

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ABSTRACT

Objective: the relationship between player and character is important to understand the concept of the extended self in virtual markets. This study aims to further understand this relationship between player and online game. MMORPGs have several resources that affect the psychological experience of players, who feel connected to their characters. The online world seems to free us from our physical bodies and provide new ways to express ourselves. Thus, the archetypal structures are part of the social imaginary, as fictional universes and avatars in online games. **Methods:** a netnography methodology was used in order to participate in an online community of the game and collect information about the construction of the game archetype, the players' relationships and their extended self, and the motivations that engage the players. **Results:** it was found that archetypes serve as limitations but also as a guarantee of involvement and satisfaction. We also identified person-building relationships in search of an ideal reality, and we found that the motivations that most drive players are the search for relationships and escapism as a way to immerse and escape from 'real reality.' **Conclusions:** the study was directed toward the archetypal construction of the game. The extended self is a form of consumption and interaction with the avatar but also an escape from 'real reality' and the co-construction of an archetype of a virtual fantasy world that forms part of the relationship and evolution of consumption and entertainment patterns.

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INTRODUCTION

"What is your character?" "Mine is the troll in golden armor," "I have an orc," or "I am the blood elf." These dialogues are common to online players regarding their avatars, representing the player within a game. However, what is the players' relationship with the game's virtual world? Do players play it, or do they feel like part of the game? What experiences motivate them to engage extensively within these virtual worlds? This relationship between player and character is important to understand the concept of the extended self (Belk, 1988) in virtual and digital markets (Ambika et al., 2023; Belk, 2013; 2016; Muhammad & Hidayanto, 2023; Thorhauge, 2024).

Computers have fundamentally reshaped how individuals work, play, communicate, and represent their sense of self (Dunn & Guadagno, 2012), broadening avenues for self-extension and altering consumer behaviors (Belk, 2013). In immersive environments, particularly in gaming, this self-extension manifests in how players align themselves with their avatars. According to Belk (2016), players often identify themselves as their avatars, experiencing a form of self-presence. As an immersive experience in virtual reality (Slater et al., 2010), the player's self-presence can be viewed as the degree to which the avatar matches the real self (Kokkinara & Slater, 2014). When virtual worlds mirror real-world structures and social contexts (Martoncik & Loksa, 2016), the avatar thus becomes the player's self-representation in accordance with the construction of an ideal self (Bessière et al., 2007; Dunn & Guadagno, 2012). Nonetheless, the dynamic relationship between player identity and motivations within fictional game environments invites further exploration, particularly regarding how archetypal themes shape these interactions.

Despite existing studies on self-representation, self-extension, and game design in online environments (Ambika et al., 2023; Patzer et al., 2020; Wang et al., 2021; Yee & Bailenson, 2007), the focus on a player environment is recent (Patzer et al., 2020; Wang et al., 2021). Drawing from archetypal and subjective theories (Jung, 2000; 2008), this paper posits that players project aspects of their subjectivity onto avatars, representing social values and collective archetypes. Consequently, the relationship between players and their avatars functions as representations of archetypes and considers the collective unconscious emerging from shared player experiences.

Avatars and immersive game environments shape players' experiences (Livingston et al., 2014; Sailer et al., 2017). The game interactions, such as conversations, exchanges, sales, purchases, and other types of relationships between players, are part of the players' experiences in a digital market (Muhammad & Hidayanto, 2023; Thorhauge, 2024). Given the limited research on immer-

sive gaming contexts, exploring the self-extension within these environments is pertinent (Patzer et al., 2020; Wang et al., 2021). Additionally, distinguishing between players' real and ideal selves in interactive media warrants further study (Kokkinara & Slater, 2014). Thus, this perspective opens the gap to the degree of self-extension and identity expression within archetypal game contexts.

Most existing research predominantly covers North American, European, and Chinese gaming communities (e.g., Bartle, 2004; Bessière et al., 2007; Williams et al., 2006, 2011; Yee, 2006; Yee & Bailenson, 2007). Our understanding of other countries' players' characteristics and insights into the cultural and social nuances of players from different regions are limited (Rapp, 2018b). In this sense, Brazil is the largest gaming market in Latin America, with an estimated 136.6 million online players and projected revenue surpassing 2.4 billion USD by 2024 (Statista, 2024a; 2024b). It is important to explore the motivations that drive players to deeply engage with their avatars and gaming environments (Bessière et al., 2007; Williams et al., 2011; Yee, 2006), and Brazilian players offer a particularly valuable context for this investigation. The study focuses on players' motivations and explores the boundaries separating casual online gaming users from fully engaged players.

To understand the experiences of self-extension, archetypes, and motivations in MMORPG online games, this study aims to investigate the relationship between players and their avatars within the archetypal game context, exploring the boundaries of player identity and motivations in online gaming environments. The Brazilian community of the Massively Multiplayer Online Role-Playing Game (MMORPG) World of Warcraft (WoW) was selected since WoW is an adequate context to investigate players' relationships with the elements of a fictional universe (Bessière et al., 2007; Billieux et al., 2013; Brehm, 2013; Livingston et al., 2014; Nardi, 2010; Patzer et al., 2020; Rapp, 2021). Thus, this article explores the user experience of WoW players to understand its meanings, influences, and practices, and contributes to the literature on cultural consumption and consumption experience within the perspective of online game archetypes, self-extension, and player motivations in the Brazilian context.

THEORETICAL BACKGROUND

Contextualization of WoW MMORPG

MMORPGs' content, expressions, and interactions are responsible for guiding the player's experience (Wang et al., 2021). WoW is the most recognized MMORPG (Forbes, 2024), reaching 144 million players by 2024 (MMO Populations, 2024). WoW has real-time player activities within a virtual world comprising also social interactions

(Liu, 2016), allowing people to face long-term challenges (Rapp, 2020; Wang et al., 2021). WoW is both a viewing experience, such as watching a movie, and an active experience, like playing sports (Nardi, 2010). People play with characters that acquire skills, experience, and resources to defeat monsters, discover locations, and interact in social and non-social objectives (Bessière et al., 2007).

WoW players must choose the avatar's gender, profession, and appearance (Sohye & Reeves, 2009), as well as one race and one faction (i.e., horde or alliance). The strengths and abilities are key to play since skills are complementary to playing alone or collaboratively (Bergstrom et al., 2012), influencing how the avatar is perceived in the game (Kromand, 2007). The avatar will be played to accumulate numerical attributes (such as points) and functional abilities (Livingston et al., 2014; Williams et al., 2011). The avatar is the gameplay protagonist and the mediator of the fictional and sensorial experience for the player (Banks & Bowman, 2013; Kromand, 2007; Livingston et al., 2014).

Social interactions are fundamental in WoW since a virtual society exists within the game (Taylor, 2006), leading to immersion (Choi & Kim, 2004; Sailer et al., 2017). In virtual environments, people can share their interests, motivations, and experiences with other players (Martoncik & Loksa, 2016). The game's layout promotes interaction among individuals or groups (guilds), organizes activities, and fosters community development (Pearce, 2011). WoW players can develop long-term relationships, enabling different forms of communication and interaction (Williams et al., 2006) between physical humans and digital avatars (Ambika et al., 2023; Banks & Bowman, 2013). MMORPGs imply competition and collaboration, increasing players' engagement and allowing the expression of skills through avatars (Bessière et al., 2007).

Carl Gustav Jung's concept of archetype in analytical psychology

Jung (2000) saw the unconscious not only as a repository of repressed memories and drives but also as a system passed from generation to generation, alive in constant activity, organized according to collective and inherited functions. According to Jung (2008), dreams, fantasies, motivations, mythological symbols, and other mental states are consistent with the collective unconscious. The collective unconscious is the accumulation of memories transmitted and universal ideas preserved throughout the generations (Hall et al., 2000). When representing symbols of the social and human imagination, the term 'archetype' refers to symbolic elements that can be found in different cultures as universal ideas to

characterize thoughts and feelings (Jung, 2000). Thus, 'collective unconscious' and 'archetype' are inseparable (Jung, 2000).

Video games have embedded a profound knowledge about game elements that should be designed to stimulate players' engagement. Therefore, the archetypal design of WoW stories and narration techniques had created a human-like social experience and support the formation of different kinds of social relations (Rapp, 2018b). MMORPGs are governed by structured virtual world interactions, whether physical (walls, flights, and maps), political (faction disputes), or social, to restrict behavior within the game (Williams et al., 2006). As players advance in the game, they face norms, conventions, and choices (Bergstrom et al., 2012). The game brings players into game archetypes (e.g., raids, quests, or PvP) (Debeauvais et al., 2011). The stories shape the members' imaginary around episodes, places, and characters (Rapp, 2020). Guilds have common rules and shared culture, experiences, history, identity, values, beliefs, ideas, and affective relations (Rapp, 2018b; 2020). Even game time is essential for interactions, promoting a shared experience and engagement, retaining players over the long term (Rapp, 2020; 2021; Wang et al., 2021). These design elements and archetypes help players feel close to other players, improving the game experience and satisfaction (Patzner et al., 2020; Sailer et al., 2017). The aesthetic archetype is a critical element of game involvement. The game mechanics and architecture impact the game's social formations and interactions. As game immersion occurs and players experience their existence in the online world, their identities and beliefs may differ from those of the physical world.

Online players can create avatars based on values representing archetypes, according to the Jungian approach (Martínez-Cano et al., 2019). WoW empowers players to build social experiences, friendship, affection, and even love through exchanging words, deeds, and gifts with symbolism valid in virtual and real worlds (Pace et al., 2010). An avatar represents a player's collection of memories and experiences, similar to a memento in a scrapbook (Livingston et al., 2014). WoW is influenced by archetypal design, which shapes interactions and favors the emergence of social structures (Rapp, 2018b) and the construction of meanings (Rapp, 2018a), leading to game enjoyment. Not all in-game behavior is controlled or predictable. In games like WoW, players display spontaneous and even rebellious behaviors that shape the community and interactions. These behaviors reflect archetypes within the game world, where free will is projected onto the social imaginary, enriching dynamics and the collective experience.

Regarding digital marketing, the archetypal design of MMORPGs like WoW illustrates how symbolic frameworks and the collective unconscious drive player engagement and satisfaction. By leveraging universal archetypes, developers create immersive environments that resonate with deep psychological drivers, enhancing social connections and emotional bonds among players (Patzner et al., 2020; Rapp, 2018b). This alignment of design with archetypal imagery fosters meaningful social interactions, creating emotional bonds that not only retain players but also strengthen their loyalty to the game. As marketing strategies increasingly leverage these psychological principles, understanding the archetypal foundations that drive social and emotional experiences becomes essential to building immersive and engaging digital platforms.

Digital self in World of Warcraft

One of the first gamers' actions in MMORPGs is to create an avatar to present and represent their online identity. Avatars are crucial for game enjoyment, and their appearance is important for status, trust, self-disclosure, and socialization (Dunn & Guadagno, 2012; Livingston et al., 2014; Neustaedter & Fedorovskaya, 2009). Avatars can be extended bodies and minds, in constant evolution (Belk, 2014). Players can express themselves creatively through the design of an avatar, and this is associated with self-expression, accomplishment, and social recognition. The avatar is an agent through which the player acts in the game world, interacts with other players, immerses the player in the virtual world, and receives all sensory information about the game.

The digital universe can provide freedom from reality (Ambika et al., 2023; Belk, 2014) and new ways of expression (Belk, 2016). The choice of an avatar demonstrates a unique combination of personality, skills, and functions (Brehm, 2013). As part of the game, players usually spend months or even years developing their avatar (Li et al., 2013). The avatar allows a projection of self and an emotional attachment to the character (Livingston et al., 2014), enabling awareness, touch, activity, and expressiveness, which are fundamental to the game experience and intimate interactions. Players have strong identity relationships with their avatars and build them to represent an ideal version of themselves. When players experience this 'psychological fusion' with avatars, they place themselves within the virtual spaces (Banks & Bowman, 2013).

MMORPGs' resources affect the psychological experience of players who feel connected to their characters (Bessière et al., 2007; Li et al., 2013), and the degree of relationship between the player and the avatar is fundamental for understanding the psychological experiences

(Sohye & Reeves, 2009). Virtual worlds offer people the ability to freely express and change undesired identity characteristics. The avatar can somehow compensate for personality deficiencies (introversion, neuroticism, low self-esteem) (Dunn & Guadagno, 2012). The relationship between player and avatar has an intense emotional effect that resembles the level of intimacy and interaction with another close person, leading to a long-term effect on the players' identity (Li et al., 2013). Most players gravitate toward roles that fit their pre-existing personality types (Williams et al., 2011), or, in some cases, the avatars are a merge of their real and ideal selves (Bessière et al., 2007; Dunn & Guadagno, 2012). Bartle (2004) classifies the players based on how much their avatars represent them in real life. Players start controlling their avatars and this evolves to avatars representing them, both as separate identities. Subsequently, users become characters, where the avatar is an extension of the user's self. At the final level, personas, users become their avatars and the virtual identity can overlap the player's real identity. All this has a dramatic effect on the digital environment's behavior (Yee & Bailenson, 2007), enabling new analyses of the WoW universe, including addressing self-immersion in an archetypal environment.

In the realm of digital marketing, understanding the deep psychological bond between players and their avatars in MMORPGs reveals critical insights for creating immersive and engaging experiences. The customizable nature of avatars allows players to express their identities, desires, and even ideal selves, fostering a powerful sense of self-relevance and attachment (Livingston et al., 2014; Sohye & Reeves, 2009). This connection drives long-term engagement and offers intense emotional experience effects that can shape their identity over time. By leveraging these insights, digital marketing strategies can enhance player loyalty and create meaningful, personalized interactions that resonate on both psychological and symbolic levels.

Self-motivation in a digital world

Interdependent self-construction is based on interactions, resulting in being self-defined by relationships. However, not all players look for the same things in the game (Debeauvais et al., 2011), and those differences are important for continuous experiences (Patzner et al., 2020). Therefore, individuals could develop intimate and harmonious relationships (Kokkinara & Slater, 2014).

Digital gaming can be both a problematic and an appealing activity, providing enjoyment and meaningful social interaction (Mandryk et al., 2020). Players with a high social motivation component can play for more years than other players. WoW guilds end up being achievement-oriented to accomplish the hardest tasks

of the game and socially motivated to increase player commitment because they add new play motivations for their members (Debeauvais et al., 2011; Rapp, 2018b), sometimes replacing real-world social networks (Rapp, 2018b). The players' projections with the game fiction and interactions may reveal social bonds and stereotypes (Silva et al., 2021). The gamers' social interactions also serve as a basis to understand their lived experiences.

Although playing digital games arouses pleasure (Mandryk et al., 2020), the players' motivation can be so impactful as to provoke compulsive behaviors for entertainment (Carmona & Whiting, 2021). Williams et al. (2011) point out that virtual spaces can be used by players with different motivations: (1) immersion in the desire to construct character histories and fantasies within the game; (2) escapism as a place to relax and escape from real life; and (3) social interaction to form relationships and build casual chatting. Thus, online games are a constructive element in enhancing creativity tools to exercise the imagination, build and improve players' skills, and function as a healthy coping mechanism for offline escape (Williams et al., 2011). Within virtual worlds, the stakes of embracing these roles are significantly lower than in real life. This anonymity allows players/avatars to escape real-world norms and expectations and try enhanced versions of their real-life or alter egos who behave in different ways.

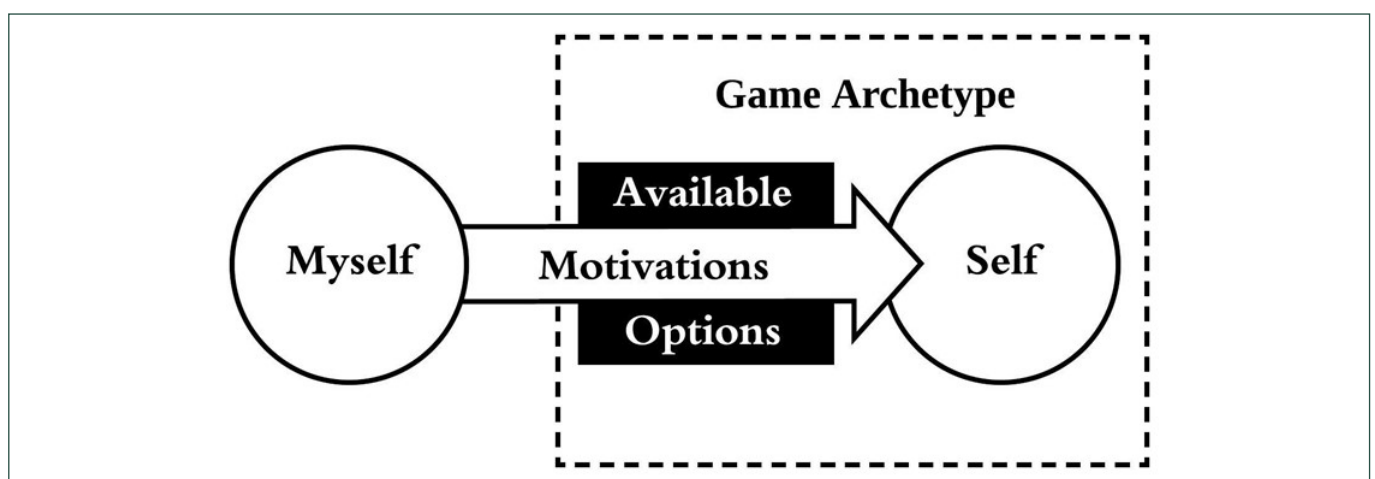
Yee (2006) describes the components and factors that affect the motivations of online gaming users: the achievement component, where users need to advance in the game, gaining power and accumulating game symbols (advance), understanding the game mechanics and optimizing the character's performance (mechanics), and facing challenges and competition (competition); the social component, where the players have to

socialize with other players (socializing) by establishing meaningful long-term relationships (relationship) and obtaining satisfaction from being a group member (teamwork); and the immersion component, finding and knowing things that most players don't know (discovery), where they must create a persona to interact in an improvised story (role playing), by personalizing the character (personalization) and using the online environment to avoid thinking about real life problems (escapism).

In the realm of digital marketing, understanding the diverse motivations and social dynamics of online gamers is crucial for designing engaging and meaningful experiences. MMORPGs like WoW cater to a wide range of player needs, from escapism and social interaction to achievement and self-expression (Williams et al., 2011). As socially motivated players, the ability to construct interdependent relationships within the game world fosters long-term engagement. Moreover, the anonymity of virtual spaces allows players to experiment with alternate identities, escaping real-world constraints and enriching their imaginative and social experiences. Recognizing these motivational factors (Yee, 2006) can guide the creation of immersive campaigns that resonate with players' desires for connection, achievement, and escapism.

Theoretical framework of insertion of the self and motivations in the archetype of virtual worlds

The previous theoretical background can be summarized in Figure 1, illustrating that archetypes are part of a game's settings, where players can experience, interact, and develop the archetypal game world according to their personal motivations. Thus, those game arche-



Source: Prepared by the authors.

Figure 1. Theoretical framework of the self within the archetype of virtual worlds.

types encompass the development possibilities for the player's self.

Archetypes are also where a player experiences, interacts, and develops the archetypal world of the game (Kromand, 2007; Williams et al., 2006). Thus, the game archetypes are development possibilities of the player's self. The avatar is a player's virtual self-representation (Yee & Bailenson, 2007) while extended self is where a player projects their characteristics and desires within the predefined archetypes game options (Bartle, 2004; Belk, 2013; 2016). Finally, a player's motivations are what propel their self into the game to explore, immerse, and develop options in the virtual universe instead of their reality (Bessi re et al., 2007; Kokkinara & Slater, 2014; Williams et al., 2011). Thus, players enter the game world through their avatars (Kokkinara & Slater, 2014; Livingston et al., 2014), driven by personal motivations (Williams et al., 2011; Yee, 2006) to experience the game's story and environment (Dunn & Guadagno, 2012; Kromand, 2007; Neustaedter & Fedorovskaya, 2009), which are shaped by archetypal settings within the game (Sohye & Reeves, 2009). These elements function as a collective unconscious, enriching the shared gaming experience.

This framework explores the user experience of WoW players (Livingston et al., 2014; Sailer et al., 2017) to understand the construction of meanings, influences, and practices (Kromand, 2007; Rapp, 2018a). This perspective delves into the context of cultural consumption and consumption experience (Bessi re et al., 2007; Williams et al., 2011; Yee, 2006) within the perspective of online game archetypes, self-extension, and player motivations.

METHODOLOGY

This study follows the netnographic approach (Kozinets, 2002; 2010), which is ethnographic research deeply immersed in an online environment to study its users, communities, interactions, and discussions. Netnography can study values, immersion, symbolism, consumption patterns, and cultural experiences of the players' culture in an independent environment to gather insights and data without the influence of the marketing industry (Kozinets, 2002).

WoW was adequate for this study due to its popularity (Billieux et al., 2013), with over 144 million players worldwide, 500 million avatars, and frequent expansions to increase engagement (Blizzard, 2017; MMO Populations, 2024). The Facebook community 'WORLD OF WARCRAFT BRASIL,' gathering more than 50 thousand members, was selected to reach real players and not their avatars.

As a WoW player, the first author joined the online community and started a discussion about the construction of the game and the depth of the players' immersion in their roles to gather insights on symbolism and consumption patterns of players. The participants were players who participated in the online community and responded to the posts made by the first author. The following questions were asked on different days to achieve greater interaction: (1) "What is more important in the game? What does WoW mean to you?"; (2) "What is more important when creating your character in the game? Which attributes or characteristics (physical or not)? And why?"; and (3) "What does WoW mean to you? What is the main reason you like the game so much? Why?" After the first interaction, the respondents were informed about the research. Multiple interactions occurred between the first author and group members and among the members, where experiences and expectations were shared in Portuguese. Some members preferred private messaging, and some topics could be worked on in greater depth.

Kozinets (2020) highlights the immersion performed by the researcher, representing the depth of interactions and the quality of the material collected. For netnography, it is important that the goal of community members is to interact through game information. Netnography considers the common interest of the members of a given community, in this case, WoW players, and, based on the anonymity principle of the participants allowed by the methodology, the sampling was by convenience, i.e., active participants interacting and answering the questions. Since WoW and the Facebook community are on online platforms and the users create content in real time, this research can be considered a netnography. Also, players are freely interacting in the community outside the company's influence with the first author positioning as a community member.

Data were collected between October and November 2019. Despite a relatively short period compared to other ethnographic studies (e.g., Nardi, 2010; Pearce, 2011), the collection rate was considerably fast and high. The interaction with some participants continued through private messages, reinforcing the researcher's immersion. The questions were posted separately, and data collection occurred while there were responses and interactions from the community participants. From the moment the participants stopped interacting with Question 1 (Q1), the collection of responses and interactions was completed, and Question 2 (Q2) was started. Once again, without further responses and interactions, we moved on to Question 3 (Q3). When the answers and interactions for Question

3 stopped, all the data were collected, and we began the analysis.

To ensure confidentiality, the data were encoded using numbers, considering the answers and interactions from the respondents as follows (Question.Answer.Interaction). For instance, Q1.1.1 represents Question 1, Answer 1, and Interaction 1; Q2.4.7 means Question 2, Answer 4, and Interaction 7. There were 69 answers to Question 1, 17 answers to Question 2, and 13 answers to Question 3, totaling 382 different interactions. Therefore, the first question ranges from Q1.1 until Q1.69.1, the second question from Q2.70 until Q2.87.5, and the last question from Q3.88 until Q3.101.1. The content analysis for those interactions was in Portuguese and the excerpts were translated for this paper (Bardin, 2016).

The data were analyzed in three stages, following Bardin (2016), starting with a fluctuating reading, using closed grid categorization (archetype, self-extension, and motivations). Next, the coding step took place, categorizing and classifying the data according to the theoretical review. Finally, the data were treated and interpreted, emphasizing the main concepts revealed in the analysis and discussed later. This research followed the ethical requirements established by the Brazilian board of ethics.

RESULTS AND DISCUSSION

Bessière et al. (2007) described the WoW immersion environment, focusing on player choices, preferences, and decisions, built within the archetype, self-extension, and motivations categories. The themes are interconnected and therefore appear in more than one thematic point in the analysis.

World of Warcraft game archetype

The WoW archetype lays out a set of complex and broad conditions that players need to take into account when creating their game character (Kromand, 2007; Sailer et al., 2017; Williams et al., 2006). To build the avatar within the game's archetypes, presets are the first part of the game's story development.

To me, WoW represents an inexplicable emotion, I started playing in the Pandaria expansion, ... when I installed the game and saw the Pandaria intro I was very, very excited, when I made my first character (a human) and I heard the introduction of humans talking about King Varian Wrynn, I knew right away that I would always play human. ... I created the characters and kept repeating and repeating the same missions over and over..., I remember ... Stormwind and arriving at the entrance bridge and

seeing the statues of the heroes there, I stopped and read every sign of that one, I walked through Stormwind and it was exciting, listening to the living world of WoW, for me, was wonderful, even today I am enchanted by this wonderful game... (Q1.43).

Players experienced a deep sense of immersion in the game, which is essential for their engagement with the game's archetypal structure (Livingston et al., 2014). This immersion allowed them to express themselves freely within the virtual world (Martoncik & Loksa, 2016). The avatar's experiences and memories (Livingston et al., 2014), shaped by the game's archetypal design (Rapp, 2018b), combined with the player's personal projections onto the game world's symbolism, align closely with Jungian archetype theory (Martínez-Cano et al., 2019).

One of the most important factors was the game lore, as Q1.12 stated: "Lore. In fact, I think it is [that] what keeps the game alive." The term 'lore' refers to the game universe in the archetypal design, such as game past and present history, content, interactions, culture, native languages, magic, geography, among other factors that constitute the game universe (Debeauvais et al., 2011; Livingston et al., 2014; Pace et al., 2010; Rapp, 2018b; 2020; 2021; Wang et al., 2021).

The story of WARCRAFT [WoW] is one of the richest of video games, characters, locations, remarkable events, literally a giant and unique world. The franchise is over 20 years old... Few works achieve this longevity, and still with full support and affection from the fans (Q1.12.2).

And we could talk to them and 4 special NPCs [non-playable characters] told more about the tribe, conflicts, religion, society, and it was a way for us to explore and get to know more (Q1.33.5).

And speaking of lore... I am fascinated by the history of the WARCRAFT [WoW] universe: everything has a background, and despite that, they are still adding something new! The WARCRAFT [WoW] universe is huge, and there is still more to see (Q1.174).

The essence of WoW is social conflicts. As Q1.174 explained, "... the game is necessarily about the conflict between two different factions [Horde and Alliance], and I believe that this is the main engine of it." The participation in the fictional universe becomes broader and more detailed as characters are distributed into races and classes. It is also noteworthy the admiration for the game universe and collectivity: "My experience as

a player was wonderful, you gather a group of friends to venture out, fight against other players [different factions], chasing achievements and mounts together, this is what makes me, until today, be in the WoW" (Q1.51.2). In a discussion between two respondents, the rivalry that builds part of the 'lore' is noticed, the clash between Horde and Alliance:

... due to the fact that humans abandoned the Blood Elfs [playable race] in Outland, in WARCRAFT 3, out of sheer arrogance and that the Orcs are nothing more than a bunch of refugees fleeing from hell just wanting a place to live, those are my reasons for being in Horde (Q1.1.15).

...the orcs invaded Azeroth, killing peasants and innocents in tremendous violence, destroyed Stormwind [Alliance City] and you still say that they are refugees, poor people? They were deceived and enslaved by the Burning Legion...! The Blood Elves [Alliance playable race] you ... they did sh*t, starting with Azshara and their madness for the power of the Eternity Fountain... Horde and the Alliance made mistakes, but don't blame the Alliance alone for that (Q1.1.18).

Concerning game mechanics and architecture (Kromand, 2007; Williams et al., 2006), people share what is socially understood as right or wrong (Jung, 2000). This perception reveals how they consider the similarities of the real world with what happens in the fictional universe (Martoncik & Loksa, 2016). This is how they relate and associate with other players, focusing on the values they believe in as they share the game universe (Rapp, 2020). This social condition composes the different categories about the WoW characters that make up the game.

Guilds and their members have common rules and shared culture, experiences, history, identity, values, beliefs, ideas, and affective relations (Rapp, 2018b; 2020). Even the game-time design archetype is essential to engaging interaction experiences through temporal activities or players' coordination, promoting a shared experience in the long term (Rapp, 2020; 2021; Wang et al., 2021).

The fantasy reveals passion by the symbols (Hall et al., 2000; Jung, 2000; Martínez-Cano et al., 2019; Pace et al., 2010), motivated by the collective unconscious, representing the social and human imagination symbols (Hall et al., 2000; Jung, 2000). The players' admiration and their perceived experiences show what can be projected onto symbols, personas, and archetypes with

memories of lived and collective experiences (Jung, 2000).

It was possible to identify projections of archetypes (Jung, 2008; Kromand, 2007; Williams et al., 2006) symbolized in the WoW race conflicts. Q1.70.4 stated, "I usually combine these things with the intention of being faithful to the story to feel part of it, part of the story and the environment, I feel good in knowing that I am being faithful to my people and the story of the game." The use of archetypal images can be applied to promote emotional involvement (Livingston et al., 2014; Pace et al., 2010), as Q1.35 expressed: "I can go anywhere, defending my ideals, my form of justice, fighting for the Horde, for the Races that are there, without belittling the enemy."

Those excerpts reassure the bond with symbols and myths that consolidate the formation of archetypal projections (Jung, 2000; Pace et al., 2010). WoW precisely represents a fantasy game that allows participating and interacting in the virtual world with characteristics of the real universe (through symbols). As highlighted by Q1.59.2, "What most contributes is that you do not need to stay stuck in one thing only, you can do a lot of things and immerse yourself in the fantasy world of WoW." This condition is underscored by players when they reveal interactions when immersed in the virtual world (Martoncik & Loksa, 2016; Patzer et al., 2020; Sailer et al., 2017). They also manifest positions in their realities and in their (virtual) social relationships (Bessière et al., 2007; Kokkinara & Slater, 2014; Liu, 2016; Slater et al., 2010; Williams et al., 2011).

WORLD OF WARCRAFT GAME SELF-EXTENSION

Self-extension is what players are inside the game. To explore how WoW players project their self onto their avatars, participants were asked to identify attributes typical of their avatars and recognize which aspects of their own personality are reflected in their characters. This allowed an understanding of the applicability of the concept of extended self (Bartle, 2004; Belk, 1988, Belk, 2013; 2014; 2016).

Players idealize themselves when creating an avatar (Bartle, 2004; Bessière et al., 2007; Livingston et al., 2014; Neustaedter & Fedorovskaya, 2009; Yee & Bailenson, 2007), so the bond makes them interact and express themselves in the virtual world (Li et al., 2013; Livingston et al., 2014), as shown in the following interaction of Q1.25:

Well, in WoW I can be whoever I want, I can do whatever I want. It is my escape from the reality of this world, which has become boring. There are

times when I go to Mulgore to look at the landscape for several minutes, near my fire... the game is magnificent and wonderful to live in, not just playing (Q1.25).

In WoW, players project real-life values onto their avatars (Banks & Bowman, 2013; Bartle, 2004; Bessière et al., 2007; Dunn & Guadagno, 2012; Livingston et al., 2014) to demonstrate their personalities (Brehm, 2013). When creating an avatar, the player projects how they want to be seen by others and imagines how they would like to be in real life:

I play/played in the Horde, even in Tabletop RPGs I create characters that are Monsters or have monstrous characteristics, I rarely create human characters in any other Game. We are already human beings, playing different races is something you can only do in... games. Whether it's theatrical or electronic games, it became vague for me to be just a human character, monster characters suffer prejudices, have feelings and can discover feelings, and you can have different interpretations. In the case of WoW, I always played Orc, I like their Lore and I identify a lot with the fact that they were tribal warriors, lived off war, battle, conflicts, had rituals and the religious dose of Shamanism attracted me even more. Do I have other characters? Yes, I do, but my Orc Warrior is the one I am the most attached to (Q2.79.2).

In virtual worlds, people can freely express themselves, reinventing their identity (Brehm, 2013). Representing one's self-image in a self-archetype can also be part of the player extension (Neustaedter & Fedorovskaya, 2009; Sailer et al., 2017; Sohye & Reeves, 2009). As revealed by Q2.85, "When I created my Death Knight, I thought: I'm a human, and my favorite Apocalypse rider is death, my favorite comic character is 'The' Death of the Perpetuals, so why not?" while Q2.87.2 stated, "... orc it is the race that I like best in the game, "not to mention that it goes very well with warriors", which is a class that has nothing magical, it is simple and versatile."

It is possible to infer that the projection of a virtual identity is consolidated from the actions beyond the physical body (Belk, 2014). As Q1.25 shared, "I already have three [real] tattoos in its honor and I will not stop there. Regardless of whether I am Horde or Alliance, the game is magnificent and wonderful to live in, not just playing." This represents exposure to the physical environment and possible censures that may arise

from it (Belk, 2016; Dunn & Guadagno, 2012), illustrating that avatars can become part of the players' social construction and imagination (Belk, 2014).

The relationship between the player and avatar

Online identities and avatars enable numerous resources that affect the players' self-image (Bessière et al., 2007; Neustaedter & Fedorovskaya, 2009; Sohye & Reeves, 2009; Yee & Bailenson, 2007) as the avatars are the projection of the self-image (Belk, 2013; 2014; 2016; Bessière et al., 2007; Dunn & Guadagno, 2012).

An avatar is similar to the projection of the extended self as an identity of itself (Belk, 2016; Dunn & Guadagno, 2012; Li et al., 2013; Livingston et al., 2014). In this sense, Q1.16 stated, "... I love to do quests, I love to upgrade my profession. I like the story itself and I cry horribly in the cinematic rss [force of expression]. I've been playing for 9 years and I can't imagine myself without my characters [avatar], although sometimes there isn't much time left," and Q1.19 said, "WoW allows me to dream big. To raise my imagination beyond the limit, as if I were immersing myself in fantasy. It is a good escape from the real world, and regardless of the game situation, I will always feel comfortable and happy playing."

Players identify with their avatars by transferring themselves into their avatars' bodies, experiencing high psychological involvement (Banks & Bowman, 2013; Belk, 2016; Bessière et al., 2007; Dunn & Guadagno, 2012; Sohye & Reeves, 2009). Bartle's (2004) scale for classifying players and avatars separates the player from the avatar in its first level. Q1.57 reported, "I knew WoW, and I lost myself in the game's history, it caught my attention and I decided to give the game a chance, and that did me good, it became a real addiction because my head traveled while I was playing," and Q3.91 stated, "I liked the look of the WoW, the diversity of things to do. It is cool to interact with people, to do things in groups." In the second level, the users consider that the avatar is their representation, but still as separate identities. Q1.4.1 disclosed, "Oh and because I feel integrated in the game, and I like to walk around the map when I'm not doing the missions, because it is very beautiful," while Q1.37 explained, "I think the immersion of the lore makes you really feel part of the story and the game, moreover it was the first mmorpg to which I really dedicated myself to." In the third level, the avatar becomes part of the user's identity, an extension of the user's self. "The game represents my life kkkk [force of expression] literally ... I grew up playing WoW. I learned English playing WoW. I got married playing WoW. To this day I play WoW" (Q1.36); "My moment of peace. Azeroth and my perfect world" (Q1.48); "the game offers enough immersion to make someone full

of physical, psychological and human problems live a real experience, it seems that we live WoW" (Q1.10.2). At the final level, personas, users perceive their avatars as themselves and the virtual identity overlaps the real one. "Every experience I had at WoW was important, ... the possibility of being able to 'transfer' and evolve my consciousness in a fantastic world and with a different reality" (Q1.21.3); "I feel like I am inside that world, it is something outside reality, and that makes me very happy!" (Q1.15).

World of Warcraft game player motivations

The importance of WoW is different for each player, and it is necessary to understand the game characteristics that may influence players' motivation to immerse in the world of WoW. The players shared their attraction to the game due to the experience gained, evolution in the game, evolution of skills, and social objectives (Bessière et al., 2007; Yee, 2006). The immersion steps will be discussed considering Yee (2006).

The conquest component in the fictional universe

Advancement is characterized by the conquest component, the desire to gain power, progress, and accumulate game symbols (Banks & Bowman, 2013; Kromand, 2007; Williams et al., 2006). About the conquest component as a player preference, as stated by Q3.93, "I (prefer conquest) mainly because of the lore and the experience that the game gives us of experiencing the advancement storyline up close throughout the expansions". About accumulating game symbols, Q3.92.2 tells that "I really like doing ALL the quests on all the maps, exploring them 100% and understanding everything about all the areas... Honestly, the experience of levelling with other players and the game kind of forcing people to form groups to complete quests was something sensational.

The advancement could be found in the immersion and interactions, revealed in the observations manifested by 'completists' and 'collectors.' This can be associated with Jung's (2000) considerations, as novelties of the game are explored (as in the case of encountering new elements in a game). Q3.89 states, "I enjoy the game mainly for collectibles (I am an addicted completist)," and Q3.93 reported, "my biggest reason to be there is to increase my collection of mounts and transmogs [transmogrification, replacing the appearance of the armor and weapons] so my hunter can live the dream of shining," while Q3.89.2 added: "I am a collector/completist, so I like to farm tmogs [transmogrification], pets and especially mounts."

The game mechanics start from the player's interest in optimizing the character's performance (Kromand, 2007; Williams et al., 2006). "Many people create in the 'tactical' form combining race and class, I create for fun" (Q2.76); "The Demon Hunter can glide and it has an extreme speed ... Death Knight can walk on Water, and has a skill that drags the enemy close to you and with a variable you hang the enemy in the air ..." (Q2.76.2); "I have several, but there are three main ones in the Horde and Alliance. One for each DG [dungeon] and Raid specialization, that is, a tanker, a healer and a dps [damage per second]" (Q2.73.2).

The competition component is found in players' desire to challenge and compete (Pearce, 2011; Sohye & Reeves, 2009). This competition is part of the game's story and lore. Regarding the WoW archetype, Q1.174 defines that "the game is necessarily about the conflict between two different factions [Horde and Alliance], and I believe that this is the main engine." The game's lore, which is part of the game's archetype, is based on a permanent dispute or conflict. However, as a component of the players' motivations, the competition can be found in a statement by Q1.51.2: "my experience as a player was wonderful, you gather a group of friends to venture out, fight against other players."

The social component in the fictional universe

When it comes to relationships among players, socialization involves helping and talking to other players (Liu, 2016; Nardi, 2010; Pearce, 2011; Taylor, 2006; Williams et al., 2006). Players can collaborate in guilds and draw on shared values, culture, experiences, identity, affection, and to explore social relationships in the fantasy immersion (Debeauvais et al., 2011; Pearce, 2011; Rapp, 2018a). "It seems that we live in WoW, in social groups (guilds and cores [fixed group of players]), stories, adventures, etc. etc., in a way that helps people who are experiencing problems to be well and stable" (Q1.10.2). "I started to learn English ..., but it was at WoW that I started to have contact with speakers of the language to truly learn to communicate, I went on Skype and played with the guys" (Q1.29.2).

The relationship component was one of the most cited by players. Relationships are brought up by Q1.23.2, "I experienced depression and through the game I made great friendships, which became a kind of family for me, and when I played I felt super good!!!" or by Q1.25.2, "The most important thing in the game experience is not being alone. Get friends like I did and have already visited them in other states. Enjoying this huge world that we have been given alongside good companies is much more fun, every pixel on the map, easter eggs, funny stories, everything is better when it

is shared with other good people. In short, the experience of the game becomes better when you know how to share sad and happy moments with your true friends," and expressing a lot of emotion, by Q1.44.12, "Certainly the affection remains, you [names of two members mentioned] are very special and important to me, and I can only thank WoW for having met incredible people who have contributed a lot to my life ❤️ I made great friends, I met people from everywhere and, even if we are apart from each other, we love each other, and nowadays, if I can't play WoW alone anymore, it's because I miss playing with these guys ❤️."

Regarding the teamwork component, the player seeks to obtain satisfaction for being part of a group effort (Bessière et al., 2007; Pearce, 2011). "What I like about MMOs is the prospect of having a large amount of activities to do that can be shared with other people" (Q3.97.2). "I liked the look of the WoW, the diversity of things to do. It's cool to interact with people, to do things in groups" (Q3.91). "The experience of leveling together, and the game kind of forcing people to form groups to complete quests was a sensational thing in my opinion and it was what made me want to keep playing" (Q3.92.2).

The immersion component, creating identities and personality projections

The discovery component is characterized by finding and knowing things that most players do not know (Li et al., 2013; Nardi, 2010), as expressed by Q1.59: "I like to follow the stories and always try to guess what will happen... The game is great, sometimes it gets tedious, but I go to another place on the map because WoW has this option, it has a giant map."

Players' motivations and satisfaction differences are important to explore the immersion experiences in a game (Patzner et al., 2020). Role-playing is the component that identifies players by creating identities, as a persona, and interacting with other players with a background archetypal story (Bartle, 2004; Jung, 2000; Kokkinara & Slater, 2014; Williams et al., 2006). Q2.80 states: "If you like fighting, take a class with melee combat; if you like to help, choose a support class; if you want ranged attack, choose mage or hunter." Q2.79.2 reported, "I play/played in the Horde, even in Table RPGs I create characters that are Monsters or have monstrous characteristics, I rarely create human characters in any other Game. ... it became vague for me to be just a human character, monster characters suffer prejudices, have feelings and can discover feelings, you can have different interpretations."

The personalization is characterized by customizing the character's appearance (Dunn & Guadagno, 2012;

Livingston et al., 2014; Neustaedter & Fedorovskaya, 2009; Sohye & Reeves, 2009; Yee & Bailenson, 2007). Q3.83 freely expressed: "My character has to look like a motherf****r [redacted]. You look at him and think 'f****n' [redacted], look at the look of the motherf****r [redacted]." "Orc is the race that I like the least in game, not to mention that it suits warrior a lot, that class that has nothing magical to it, it is simple and versatile which draws my attention. The lore and aesthetics from the orcs, I also quite like that a lot" (Q3.87.2). "The main activity that interests me is creating and personalizing characters" (Q3.97.2).

The escapism component is characterized by using the online environment to avoid thinking about real life (Bessière et al., 2007; Williams et al., 2006). This component was the most found and the one that came closest to the Belk's (2016) concept of the extended self. Escapism can be a way of transferring oneself to an alternative reality, as pointed out by Q1.17.4: "I describe the game as a world I can go to when I want to take a break from mine." The WoW makes it possible to extend the self, and to find freedom in new ideas that can be projected from social reality. As Q1.38.6 said: "The game brings me a sense of freedom that I can't have in real life, it's a relief from the stressful everyday life, WoW is my virtual bar where I chat with friends, laugh and make fun of friends, in WoW nobody is ugly or beautiful. There everyone is together."

Escapism was a way to escape from the reality of life and its problems, as stated by Q3.93: "The main reason I play is because, indirectly, WoW helps me a lot, occupying my head so as to forget a little about the hardships that life keeps on giving me"; by Q1.59.2: "the game is an adventure, it kind of takes you out of the world and its problems..."; by Q1.13: "The game is my escape valve, I've been playing for six years, I tried to stop but I didn't feel good without playing, with the people in the game that I knew for some time, I heard many stories, I knew many different cultures and it made me grow as a person enough, it will never be just a game"; by Q1.25: "In WoW I can be whoever I want, I can do whatever I want. It is my escape from the reality of this world, which has become boring. I have been playing for nine years, I never felt sad or depressed in that world, all the expansions made me happy in some way. The graphics, the story, the gameplay, it all gets me when I'm on the PC, after a stressful day at work. It's my second life"; and by Q1.40: "Life brings me down, WoW brings me up."

Escapism was profoundly presented as an escape from depression and anxiety, as reported by Q1.42: "The history of the game is the most important thing for me in the game, what makes me play. And, today, it is what

helps me deal with depression and anxiety! The friendships I have help me like no one else has"; by Q3.93: "WoW is my escape valve from current problems... depression, breakdowns, loneliness... Even though I am completely alone in the game, I forget for a few moments about the pain in the real world, and it's less difficult to follow the journey of life... I need WoW to help me continue"; by Q1.51: "WoW is a medicine that helps me with my anxiety, and provides me with many funny moments with my friends, it's just wonderful"; by Q1.58: "WoW helped me a lot with depression, I had a dark phase in my life when I saw no way out and WoW was a very important escape valve, where I had the opportunity to meet incredible people who contributed significantly to my life ❤️"; by Q1.32: "WoW saved my life, from dying of depression caused by an abortion I suffered... then I made friends and laugh a lot at the content in general. I love playing WoW"; and by Q1.28: "I have depression, I feel empty, spiritually or emotionally, I feel like a failure in life, abandoned by family members, but now I'm better. But if I don't have a goal or a fun way to distract myself, I will get worse, but in WoW I can have fun, spend time, make friends, enjoy history and do missions. It is basically an escape from the reality in which we currently live, a totally disgusting, aggressive and socially vile one, where opposing opinions are treated with such savagery and aggressiveness, so I stay away from it and keep myself in my room, safe from anything bad that can happen to me outside of it!"

DISCUSSING ARCHETYPES, SELF, AND MOTIVATIONS

According to Figure 1, the archetype construction refers to the game's immersive environment and the decision that players make when they enter the online world. Archetypes are settings that are part of the game's environment (Sohye & Reeves, 2009) where the player experiences the game's story and world (Kromand, 2007; Williams et al., 2006) as a collective unconscious (Hall et al., 2000; Jung, 2000; 2008). This study confirms the previous studies (Debeauvais et al., 2011; Rapp, 2018a) where the predefinitions are part of the game environment and conduce the players to the adventure. These predefinitions keep players within an environment, preserving possibilities throughout the game as a guarantee of the involvement experience and satisfaction (Bergstrom et al., 2012; Rapp, 2020; 2021; Sailer et al., 2017; Wang et al., 2021).

Archetypes in WoW serve as foundational symbols and narratives, creating an environment that fosters both personal and collective player experiences. Thus, this study found that the game lore is what most defines the archetypal constitution of WoW. The term 'lore'

refers to the entire environment, history, and evolution that draw players to the game. According to the literature, these are elements and symbology in the game that attract the players (Debeauvais et al., 2011; Pace et al., 2010; Rapp, 2018b, 2020, 2021; Wang et al., 2021). Drawing from Jung's theory of archetypes and the collective unconscious, WoW's lore embodies universal symbols, mythological references, and shared storylines that shape the collective engagement of players. Players' narratives, shared within guilds, reinforce the game's archetypal structure, giving it a collective dimension that resonates with each individual, much as Jung suggests universal symbols resonate across cultures. This study confirms the significance of lore in WoW as a key driver of engagement, as seen in players' dedication to guild loyalty and quest completion.

Another advantage observed of the game's archetypes, despite being a set of limitations, is that archetypes give the player freedom to express themselves. This study reinforces the literature (Livingston et al., 2014; Martoncik & Loksa, 2016) that players can be who they really are. This makes up a reliable and sustainable way for players to be attracted to WoW and to feel free to be themselves in a virtual fantasy context. Here, archetypes foster a shared 'social unconscious' (Hall et al., 2000; Jung, 2000), where symbols, mythological characters, and group conflicts, such as the Horde vs. Alliance dichotomy, reflect deeper social dynamics that players recognize and internalize, giving them both communal and individual meaning.

The avatar acts as a projection of the player's idealized self, allowing them to explore aspects of their personality within the constraints and freedoms of the virtual archetypal world. This study reinforces the relationship between the player and the avatar, regarding the extended self (player's projection in the game) (Belk, 1988; 2013, Belk; 2016), and differences between user and persona (Bartle, 2004), which is crucial to understanding the players' experiences (Sohye & Reeves, 2009). Mainly, it is an identification with the archetypal world in which the avatar was inserted (Yee & Bailenson, 2007). Based on the concept of the extended self, avatars enable players to extend and reframe their identities, presenting enhanced, ideal, or alternate versions of themselves in a digital format. Brazilian players displayed strong attachments to their avatars, not merely as game tools but as extensions of their real identities. In the Brazilian dimension, the persona was deepened in understanding by the gaming community. In line with Belk (2016), Bessière et al. (2007), Dunn and Guadagno (2012), Martoncik and Loksa (2016), and Slater et al. (2010), this study in the Brazilian community shows that, more than a way to express themselves,

in the game reality as part of the construction of the self. This phenomenon aligns with Belk's assertion that digital possessions like avatars become a central part of self-identity. Different from previous studies, where players have different degrees of relationship with their avatars (Bartle, 2004; Sohye & Reeves, 2009; Williams et al., 2006; Yee, 2006), in the Brazilian context, the persona's extended self has been interpreted more often in ways of escaping reality problems and depression. The extended self is where the player projects characteristics and desires, interacting with the avatar, but it also constitutes an escape from the 'real reality' in search of an 'ideal virtual world.' As players invest time in their avatars, they experience a 'psychological fusion,' where the avatar identity begins to overlap with the real self (Banks & Bowman, 2013). This is usually the case for players who immerse themselves in the game in order to escape a depressing and problem-filled reality. This finding is especially pertinent within the Brazilian gaming community, where avatars often serve for escapism and emotional expression, providing relief from personal challenges such as depression and anxiety.

Motivations in WoW fall under three main categories, all identified in this research: achievement, social interaction, and immersion (Yee, 2006). Each of these motivations plays a distinct role in the digital self-extension process, revealing deeper psychological drives aligned with both self-fulfillment and social identity. The achievement component is where players in WoW strive for advancement and status, driven by goals such as accumulating rare items, achieving levels, and personalizing their avatars. This pursuit reflects a symbolic journey often grounded in archetypal quests, where the player-hero embarks on adventures that mirror real-life aspirations. The Brazilian respondents in this study identified with roles of 'collectors' and 'completists,' driven to explore every aspect of the game, interested in optimizing the avatar, wishing to compete with other players, and creating a personal mythology within the digital space.

The social component is the desire to socialize with other players, as a form of help, or to create and maintain long-term relationships between players, or guild teamwork, providing satisfaction for being part of a group. WoW offers players a social network, where relationships evolve in guilds, fostering cooperation and group identity. Brazilian players particularly value the social bonds they form within the game, which often extend beyond mere friendship and become supportive networks that address real-world emotional needs. The social dynamics in WoW echo Jung's concept of the collective unconscious, where players align around shared archetypal narratives. For many, guild interac-

tions offer emotional support, acting as a form of communal therapy in dealing with real-life hardships such as loneliness or depression.

The immersion component is where immersive experiences in WoW allow players to delve into alternate identities through role-playing, as a characteristic of the discovery factor in the game, personalization of avatars, and escapism using the online environment to avoid thinking about real life. The immersive world facilitates self-expression, granting freedom from real-world constraints and allowing players to experience alternate facets of their identities. Brazilian players particularly emphasized escapism, reflecting on WoW as a 'second life' that allows them to disengage from real-life difficulties temporarily. This form of immersion resonates with the concept of the digital self, where the game environment becomes a 'safe space' for identity exploration and personal growth. Through archetypal roles and quests, players can navigate and express complex emotional landscapes within the game's symbolic framework, which validates their experiences and reinforces their emotional bonds with the virtual world.

Each of these motivations plays a distinct role in the digital self-extension process, revealing deeper psychological drives aligned with both self-fulfillment and social identity. Brazilian players' motivations to engage deeply within the WoW universe reflect both personal needs and collective experiences shaped by archetypal influences. In the Brazilian community, the social component of relationships was a key characteristic, as a form of significant long-term relationship. This characteristic was also associated with the constitution of the community as a way to help other players get out of depression and anxiety. In the immersion component, the most cited characteristic associated with Belk's extended and digital self and the motivations to play was escapism. Players used it as an escape from reality, an escape from problems and depression. It is worth mentioning that many members of the community cared for and identified with the forms of relationship and escapism. During the research, the level of the players/respondents' empathy was frequent, and Q141 mentioned, "This is one of the best posts I have seen on Facebook. To all who feel depressed, I wish them much strength. And if you want a partnership to play, add me." One of the best posts was related to the amount and depth of the interactions and sharing presented. Many felt at ease to write about their anxieties and feelings. The identification was frequent, which deepens the sense of community, as part of the archetype, and of the self, as recognizing the virtual world as an ideal world. This context is part of the game experience to have motivations to immerse in the game reality.

Contribution to literature

This study discusses the results within the archetype, self, and motivations framework in MMORPGs, particularly within the Brazilian context of World of Warcraft (WoW) (e.g., [Bartle, 2004](#); [Bessière et al., 2007](#); [Yee, 2006](#)). The Brazilian context offers a distinctive perspective by highlighting cultural and social nuances in player-avatar relationships. This enriches our understanding of identity projection and community-building within virtual gaming worlds. This study deepens our understanding of player-avatar dynamics, highlighting the intersection of Jungian archetypes with self-extension and motivation theories in immersive virtual worlds.

In contrast to previous findings, where avatars often represent a form of entertainment or escapism, this study reveals that Brazilian players utilize their avatars not only as extensions of their real selves but also as means of emotional coping, reflecting on personal challenges such as loneliness, depression, and social anxiety ([Dunn & Guadagno, 2012](#); [Martoncik & Loksa, 2016](#)). This study demonstrates that the digital self in MMORPGs such as WoW is not merely a playful or escapist projection but a rich and multifaceted expression of personal and collective identity. For Brazilian players, avatars act as critical extensions of self, intertwined with personal history, cultural dynamics, and social needs. This insight expands on [Belk's \(2013\)](#) theory of the extended self, as avatars here are not merely possessions but dynamic extensions of players' psychological identities, offering a culturally resonant digital realm where they can express, explore, and even transform aspects of their real-world identities.

Moreover, the study integrates Jungian archetypes ([Jung, 2008](#)) to further examine how these collective symbols shape individual experiences and community engagement within MMORPGs. The concept of the collective unconscious suggests that universal archetypes influence behavior and motivation across cultures ([Hall et al., 2000](#)), a notion that becomes evident in how Brazilian players form close connections with the game's lore and their guilds and align with specific in-game narratives. This behavior reveals that players' motivations ([Yee, 2006](#)) — whether rooted in escapism, social bonds, or competitive achievement — are deeply entwined with archetypal narratives embedded within the game, such as the classic hero's journey (achievement component), guild (social component), and exploration (immersion component) ([Rapp, 2018b](#); [Williams et al., 2011](#)). The Brazilian WoW community exemplifies how the interaction between archetype, self-extension, and motivation transforms the gaming experience into a form of digital socialization and

self-exploration. Thus, by highlighting the archetypal design of WoW, this study reinforces the role of shared symbolic frameworks in shaping player engagement and digital identity, contributing to a new cross-cultural dimension to the literature on virtual self-extension and collective experience.

In understanding the motivations of the digital self through Jungian archetypes and Belk's extended-self framework, this study expands on existing literature by illustrating how the immersive qualities of MMORPGs support identity exploration and provide emotional scaffolding for players facing real-life challenges. This aligns with the idea that archetypes facilitate self-discovery by creating symbols and spaces that resonate with deep-seated psychological constructs. The Brazilian players' emphasis on escapism and social relationships within WoW underscores the role of virtual worlds as safe, immersive, independent, cultural, and satisfying environments that offer both individual fulfillment and collective resonance.

Contribution to digital marketing

From a digital marketing perspective, this study reveals how player motivations in MMORPGs, shaped by archetypes and emotional bonds, can inform campaigns that resonate deeply with the gaming community. Prior research ([Patzner et al., 2020](#); [Sailer et al., 2017](#)) suggests that digital environments fostering social connections and emotional engagement enhance brand loyalty. Extending this, our study finds that WoW's archetypal themes, such as heroic quests and faction-based conflicts, provide a rich ground for brands to create campaigns that align with these universal narratives. An online player's purchasing motivations may be influenced by the characteristics of their avatar and the groups to which it belongs throughout the game. Brands can leverage this symbolic depth by designing personalized campaigns that align with players' avatars, fostering an immersive brand presence that aligns with the player's sense of identity and in-game aspirations ([Banks & Bowman, 2013](#); [Williams et al., 2006](#)). By associating their messages with archetypal stories and symbols, brands can engage players more meaningfully, enhancing attachment and loyalty within the game's digital landscape. This would generate brand exposure and identification with the players' extended self, possibly reflecting in physical world campaigns.

The findings also underscore the marketing potential of community-based strategies, particularly in culturally distinct gaming communities where social bonds serve as primary motivations ([Rapp, 2020](#); [Yee, 2006](#)). Brazilian players often form strong social networks within WoW, perceiving guilds as support systems and

spaces of belonging. For brands, acknowledging and integrating with these social motivations — whether through in-game events, sponsored guild activities, or community-building initiatives — can foster a deeper emotional connection with players, as these initiatives resonate with their need for support, camaraderie, and escapism (Livingston et al., 2014; Pearce, 2011). By tapping into this shared social unconscious (Jung, 2000), brands can craft campaigns that are not only engaging but also offer value to players' social and emotional experiences, enhancing the effectiveness of digital marketing in the MMORPG context.

The results indicate that online gamers may have different desires and needs than those directly associated with their physical representation. Thus, digital marketing should investigate and characterize both and, eventually, identify associations between online character profiles and those in the real world. Therefore, marketing for a given consumer may have two dimensions, one online and one in the physical world. However, each game presents various roles with distinctive qualities, possibilities for action, and different behaviors. In addition to the avatars' characteristics, it may be possible to identify personality traits expressed only during the game. Thus, digital marketing can direct efforts to determine each game's most common avatar attributes, delimiting product niches and sales funnels for each character. Hence, netnography and design thinking can help companies characterize customer segments, personas, and their respective user journeys and flows.

FINAL REMARKS

This study investigated the relationship between players and their avatars within the archetypal game context, exploring the boundaries of player identity and motivations in online gaming environments. Our study presented some considerations regarding archetypes, self-extension, and motivations of WoW players (e.g., Bartle, 2004; Bessière et al., 2007; Williams et al., 2006; 2011; Yee, 2006; Yee & Bailenson, 2007) in the Brazilian context. The paper contributes to understanding the experiences of MMORPG players and to game development, as well as attraction and retention of players in the Brazilian online gaming market. As proposed in Figure 1, the archetypes are part of the players' experiences, where they will immerse themselves with different motivations.

Concerning the construction of the WoW archetypal context (Jung, 2000; 2008), it sought to understand the subjectivity in avatars' creation to represent archetype values in the game. Given the archetypal concept, it was possible to understand the self-creation by the

players and their relationship with the avatar within the game architecture (Jung, 2000; Kromand, 2007; Patzer et al., 2020; Rapp, 2018b; Williams et al., 2006). The lore, as the most important context pointed out by the Brazilian players, is a promise that the player will find satisfaction in the environment, culture, history, and evolution of the WoW game (Debeauvais et al., 2011; Kromand, 2007; Livingston et al., 2014; Wang et al., 2021; Williams et al., 2006). This makes players feel free to be themselves in a virtual fantasy context.

The avatar development is part of the self-image and self-extension in the game (Neustaedter & Fedorovskaya, 2009; Sohye & Reeves, 2009) and a way to immerse in the game reality (Kokkinara & Slater, 2014; Martoncik & Loksa, 2016; Slater et al., 2010). Based on Bartle's proposal (Bartle, 2004), Brazilian players have a relationship with their avatars, and, in deeper cases, the players were identified as personas. Here, the extended self constitutes an escape from the 'real reality' in search of an 'ideal virtual world.' In the motivation context (Yee, 2006), the escape from reality is the most significant immersion component, supported by the relationship component, where players also seek more lasting relationships as the social component. There is a fine line between what is online and what is real, what is the extended self and what is an escape from reality, as players immerse in the game and escape their reality.

It is important to further extend this research to game realities beyond the Brazilian WoW community, considering their specific characteristics. It would also be interesting to verify these characteristics within other digital markets (i.e., countries), as characteristics differing from the archetype, self, and motivations may appear. According to the study findings and unlike other studies, further research is needed on the importance of relationships and escapism among Brazilian players to understand their relative relevance, mainly addressing the association of escapism with the extended self and the relationship with game archetypes. Pursuing research in this atypical context could bring important contributions to the literature and to practice.

REFERENCES

- Ambika, A., Belk, R., Jain, V., & Krishna, R. (2023). The road to learning "who am I" is digitized: A study on consumer self-discovery through augmented reality tools. *Journal of Consumer Behaviour*, 22(5), 1112–1127. <https://doi.org/10.1002/cb.2185>
- Banks, J., & Bowman, N. D. (2013). Close intimate playthings? Understanding player-avatar relationships as a function of attachment, agency, and intimacy. *AoIR Selected Papers of Internet Research*, 3(1), 1–4. <https://journals.uic.edu/ojs/index.php/spir/article/view/8498>
- Bardin, L. (2016). Análise de Conteúdo. In *Análise de Conteúdo* (1a Edition). <https://doi.org/10.4272/978-84-9745-209-0.ch2>
- Bartle, R. (2004). *Designing Virtual Worlds*. New Riders Publishing.

- Belk, R. (1988). Possessions and the Extended Self. *Journal of Consumer Research*, 15(2), 139–168.
- Belk, R. (2013). Extended Self in a Digital World. *Journal of Consumer Research*, 40(3), 477–500. <https://doi.org/10.1086/671052>
- Belk, R. (2014). Digital consumption and the extended self. *Journal of Marketing Management*, 30(11–12), 37–41. <https://doi.org/10.1080/0267257X.2014.939217>
- Belk, R. (2016). Extended self and the digital world. *Current Opinion in Psychology*, 10(1), 50–54. <https://doi.org/10.1016/j.copsyc.2015.11.003>
- Bergstrom, K., Jenson, J., & de Castell, S. (2012). What's "choice" got to do with it? *Proceedings of the International Conference on the Foundations of Digital Games*, 97–104. <https://doi.org/10.1145/2282338.2282360>
- Bessière, K., Seay, F., & Kiesler, S. (2007). The Ideal Elf: Identity Exploration in World of Warcraft. *Cyberpsychology & Behavior*, 10(4), 530–535. <https://doi.org/10.1089/cpb.2007.9994>
- Billieux, J., Linden, M. Van Der, Achab, S., Khazaal, Y., Paraskevopoulos, L., Zullino, D., & Thorens, G. (2013). Why do you play World of Warcraft? An in-depth exploration of self-reported motivations to play online and in-game behaviours in the virtual world of Azeroth. *Computers in Human Behavior Journal*, 29(1), 103–109. <https://doi.org/10.1016/j.chb.2012.07.021>
- Blizzard. (2017). *World of Warcraft – Mais de 100 milhões de Jogadores*. Blizzard. <http://media.wow-europe.com/infographic/pt-br/world-of-warcraft-infographic.html>
- Brehm, A. L. (2013). Navigating the feminine in massively multiplayer online games: gender in World of Warcraft. *Frontiers in Psychology*, 4(December), 1–12. <https://doi.org/10.3389/fpsyg.2013.00903>
- Carmona, J., & Whiting, J. B. (2021). Escaping the escapism: A grounded theory of the addiction and recovery process in online video gaming. *Qualitative Report*, 26(7), 2171–2188. <https://doi.org/10.46743/2160-3715/2021.4643>
- Choi, D., & Kim, J. (2004). Why People Continue to Play Online Games: In Search of Critical Design Factors to Increase Customer Loyalty to Online Contents. *Cyberpsychology and Behavior*, 7(1), 11–24. <https://doi.org/10.1089/109493104322820066>
- Debeauvais, T., Nardi, B., Schiano, D. J., Ducheneaut, N., & Yee, N. (2011). If you build it they might stay: retention mechanisms in World of Warcraft. *Proceedings of the 6th International Conference on Foundations of Digital Games*, 180–187. <https://doi.org/10.1038/nrmicro2086>
- Dunn, R. A., & Guadagno, R. (2012). My avatar and me – Gender and personality predictors of avatar-self discrepancy. *Computers in Human Behavior*, 28(1), 97–106. <https://doi.org/10.1016/j.chb.2011.08.015>
- Forbes. (2024, May 5). *10 Great MMO And MMORPG Games*. Forbes.
- Hall, C. S., Lindzey, G., & Campbell, J. B. (2000). *Teorias da personalidade*. Artmed.
- Jung, C. G. (2000). *Os Arquétipos e o Inconsciente Coletivo*. Vozes.
- Jung, C. G. (2008). Chegando ao inconsciente. In *O homem e seus símbolos* (pp. 15–132). Nova Fronteira.
- Kokkinara, E., & Slater, M. (2014). Measuring the effects through time of the influence of visuomotor and visuotactile synchronous stimulation on a virtual body ownership illusion. *Perception*, 43(1), 43–58. <https://doi.org/10.1068/p7545>
- Kozinets, R. V. (2002). The Field Behind the Screen: Using Netnography for Marketing Research in Online Communities. *Journal of Marketing Research*, 39(1), 61–72.
- Kozinets, R. V. (2010). *Netnography: Doing Ethnographic Research Online*. Sage Publications.
- Kozinets, R. V. (2020). *Netnography Unlimited: Understanding Technoculture Using Qualitative Social Media Research* (1st Edition). Routledge. <https://doi.org/10.4324/9781003001430>
- Kromand, D. (2007). Avatar Categorization. *DiGRA 2007*, 400–406.
- Li, D. D., Liao, A. K., & Khoo, A. (2013). Player – Avatar Identification in video gaming: Concept and measurement. *Computers in Human Behavior*, 29(1), 257–263. <https://doi.org/10.1016/j.chb.2012.09.002>
- Liu, C.-C. (2016). Understanding player behavior in online games: The role of gender. *Technological Forecasting & Social Change*, 111(1), 265–274.
- Livingston, I. J., Gutwin, C., Mandryk, R. L., & Birk, M. (2014). How Players value their characters in world of warcraft. *Proceedings of the ACM Conference on Computer Supported Cooperative Work, CSCW*, 1333–1343. <https://doi.org/10.1145/2531602.2531661>
- Mandryk, R. L., Frommel, J., Armstrong, A., & Johnson, D. (2020). How Passion for Playing World of Warcraft Predicts In-Game Social Capital, Loneliness, and Wellbeing. *Frontiers in Psychology*, 11(September). <https://doi.org/10.3389/fpsyg.2020.02165>
- Martínez-Cano, F. J., Cifuentes-Albeza, R., & Nicolás, B. (2019). Videojuegos prosociales como espacio transicional lúdico para la paz: el caso de Reconstrucción. *Revista Latina de Comunicación Social*, 74(1), 1470–1487. <https://doi.org/10.4185/RLCS>
- Martoncik, M., & Loksa, J. (2016). Do World of Warcraft players experience less loneliness.pdf. *Computers in Human Behavior*, 56(1), 127–134.
- MMO Populations. (2024, July 3). *World of Warcraft Player Count*. MMO Populations.
- Muhammad, A. N., & Hidayanto, A. N. (2023). Gamers Intention Towards Purchasing Game Items in Virtual Community: Extending the Theory of Planned Behavior. *International Journal of Advanced Computer Science and Applications*, 14(12), 215–221. <https://www.ijacsa.thesai.org>
- Nardi, B. (2010). *My Life as a Night Elf Priest: An Anthropological Account of World of Warcraft* (1st ed.). University of Michigan Press. <https://www.jstor.org/stable/j.ctvndv9nw>
- Neustaedter, C., & Fedorovskaya, E. (2009). Presenting Identity in a Virtual World through Avatar Appearances. *GI '09: Proceedings of Graphics Interface*, 1(1), 183–190.
- Pace, T., Bardzell, S., & Bardzell, J. (2010). The rogue in the lovely black dress: Intimacy in world of warcraft. *Conference on Human Factors in Computing Systems - Proceedings*, 1, 233–242. <https://doi.org/10.1145/1753326.1753361>
- Patzner, B., Chaparro, B., & Keebler, J. R. (2020). Developing a model of video game Play: Motivations, satisfactions, and continuance Intentions. *Simulation and Gaming*, 51(3), 287–309. <https://doi.org/10.1177/1046878120903352>
- Pearce, C. (2011). *Communities of Play: Emergent Cultures in Multiplayer Games and Virtual Worlds*. MIT Press.
- Rapp, A. (2018a). Gamification for self-tracking: From World of Warcraft to the design of Personal Informatics systems. *Conference on Human Factors in Computing Systems - Proceedings*, 2018-April, 1–15. <https://doi.org/10.1145/3173574.3173654>
- Rapp, A. (2018b). Social Game Elements in World of Warcraft: Interpersonal Relations, Groups, and Organizations for Gamification Design. *International Journal of Human-Computer Interaction*, 34(8), 759–773. <https://doi.org/10.1080/10447318.2018.1461760>
- Rapp, A. (2020). An exploration of world of Warcraft for the gamification of virtual organizations. *Electronic Commerce Research and Applications*, 42(September 2019), 100985. <https://doi.org/10.1016/j.elerap.2020.100985>
- Rapp, A. (2021). Time, engagement and video games: How game design elements shape the temporalities of play in massively multiplayer online role-playing games. *Information Systems Journal*, 32(1), 5–32. <https://doi.org/10.1111/isj.12328>
- Sailer, M., Hense, J. U., Mayr, S. K., & Mandl, H. (2017). How gamification motivates: An experimental study of the effects of specific game design elements on psychological need satisfaction. *Computers in Human Behavior*, 69, 371–380. <https://doi.org/10.1016/j.chb.2016.12.033>
- Silva, J. P. N., Valadares, G. C., Pedrosa, G., Rezende, D. C., Cappelle, M. C. A., & Assis, F. A. A. (2021). Gender imbalance in MMORPG: the case of World of Warcraft in Brazil. *Feminist Media Studies, Ahead of Print*, 1–17. <https://doi.org/10.1080/14680777.2021.1973060>
- Slater, M., Spanlang, B., Sanchez-vives, M. V., & Blanke, O. (2010). First Person Experience of Body Transfer in Virtual Reality. *PLoS ONE*, 5(5), 1–9. <https://doi.org/10.1371/journal.pone.0010564>
- Sohye, L., & Reeves, B. (2009). Being in the Game: Effects of Avatar Choice and Point of View on Psychophysiological Responses During Play. *Media Psychology*, 12(4), 348–370. <https://doi.org/10.1080/15213260903287242>
- Statista. (2024a). *Number of gamers in selected gaming markets in Latin America as of September 2023*. Statista. <https://www.statista.com/forecasts/1419133/gamers-in-latin-american-countries>
- Statista. (2024b). *Video Games - Brazil*. Statista. <https://www.statista.com/outlook/dmo/digital-media/video-games/brazil>
- Taylor, T. L. (2006). Does WoW Change Everything?: How a PvP Server, Multinational Player Base, and Surveillance Mod Scene Caused Me Pause. *Games and Culture*, 1(4), 318–337.
- Thorhaug, A. M. (2024). The steam platform economy: From retail to player-driven economies. *New Media and Society*, 26(4), 1963–1983. <https://doi.org/10.1177/14614448221081401>
- Wang, H., Zhang, Z., Khalid, M. N. A., Iida, H., & Li, K. (2021). Mmorpg evolution analysis from explorer and achiever perspectives: A case study using the final fantasy series. *Information (Switzerland)*, 12(6), 1–18. <https://doi.org/10.3390/info12060229>
- Williams, D., Ducheneaut, N., Yee, N., & Nickell, E. (2006). The Social Life of Guilds in World of Warcraft. *Games and Culture*, 1(4), 338–361.
- Williams, D., Kennedy, T. L. M., & Moore, R. J. (2011). Behind the Avatar: The Patterns, Practices, and Functions of Role Playing in MMOs. *Games and Culture*, 6(2), 171–200. <https://doi.org/10.1177/1555412010364983>
- Yee, N. (2006). Motivations for Play in Online Games. *Cyberpsychology & Behavior*, 9(6), 772–775.
- Yee, N., & Bailenson, J. (2007). The Proteus Effect: The Effect of Transformed Self-Representation on Behavior. *Human Communication Research*, 33(3), 271–290. <https://doi.org/10.1111/j.1468-2958.2007.00299.x>

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