Poker in Virtual Reality

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ABSTRACT

This study examines virtual reality (VR) poker and how the platform affects poker players' experience. Players use a self-customized avatar and other features of a computer platform, that differs from in-person poker. Data were collected through observations from in-game poker VR recordings and interviews with five professional poker players. Findings are analysed theoretically through proteus effects, social presence, ecological psychology, magic circle and liminality. This demonstrates the interactive cues that poker players use when immersed in virtual reality and embodied in a digital avatar. The goals from this research are to learn about the influence avatars have on poker players; if players can still maintain their poker skills and read different cue signs from other players, while embodied in an avatar and immersed in VR. This paper also explores the promise of poker in virtual reality and its environment, examples of existing applications, a discussion of the research to date and also provides a vision for the future.

Keywords: *Virtual reality, poker game, avatars, social presence, presence, magic circle, liminality, immersion, interactivity, affordances, psychology*

INTRODUCTION

Poker is a game of deception in which players attempt to convince other players that they have better cards than their opponents. In other words, players are constantly on the lookout for their opponent's behaviors, such as the way they stack their chips, the cards they play, or the anticipation of a fold, facial expressions or reactions from having good or bad hand cards, the type of clothing players wear, body language, and repeated behavior patterns that users can use as a cue to take a more advantageous stance. Opposing players adopt various strategies to mask their emotions, such as covering their eyes with sunglasses or listening to music during the game so as to avoid any conversation, with the aim of not showing signs that opponents can use against them.

In PokerVirtual Reality (VR) game, however, the cues and behaviors are different: players are represented by an avatar (virtual self) that shows just three body parts: torso, head and hands. The virtual self, according to Agger (2008), is an "individual linked to the world and to others by electronic means such as the Internet, television, and mobile phones" (p.1). Players are also able to interact with their cards, chips and among other in-game features via physical hand controllers.

The purpose of this study is to explore poker players perceptions through the lens of a Virtual headset, while embodied in self-customized avatar. The researchers examine the specifics of virtual reality poker and why avatars (e.g., Agger 2008; Ingen 2008, Golder & Donath 2004; McNeill 2007; Wittmeyer 2015) are so important in this domain. There is a gap in the literature on digital poker gaming, and the researchers demonstrate why researching this emerging topic in poker is crucial. It is also their ambition to contribute to the growth of this lesser-known virtual reality game. The paper's analysis is based on data from a digital recording of poker players while playing a VR game, and their reflective comments after the game, as expressed in interviews.

CONCEPTUAL FRAMEWORK

Technological developments in the 21st-century have changed society in many ways, e.g., the way we communicate via mobile phones, play games and even interact with each other on a daily basis. All facets of our lives move quicker, and society as a whole has become more entangled in the digital network, becoming more "digitalized." Virtual Reality (VR) is a further technological development, as people become more accustomed to the ever-evolving digital environment. For instance, Ruddle, Payne and Jones (1999) conducted a study in which participants navigated four times in one large virtual building using the head mounted display (HMD) and the second building using the desktop. Players who used HMD were more accurate and faster to get at their final destination than those who used a desktop environment. VR training simulations have proven to be more efficient in a variety of ways, and they give all parties involved a lot of freedom. Also, according to McNeill's (2007) tests, users experience the same subconscious gesture movements in Virtual Environments (VE) as they would in the offline world during virtual engagement/communication.

Imagine the following: for a birthday party a father dresses his daughter as a Princess wielding a fairy magic wand, and the son is dressed as Superman. While the father watches the son running around with his arms stretched straight simulating flight, the daughter plays with her friends as Princesses from a fairy land. While the research is not about children who dress in a fantasy world, these visualizations point to the importance of self-individual adaptability, or as Yee and Bailenson (2007) refer to it, Proteus effects, on behavior. This leads us to consider what are the possible behaviors of an avatar in a poker player on a VR social setting. Poker is a social game in which players sit around a table with other players and compete against each other in a game of cards. Players employ a variety of strategies in attempt to earn money from the pool. Deception and bluffing are two such strategies.

Social presence is the sense of "being with others," in which one perceives the presence of another person (Biocca & Harms, 2002). While people physically sit next to one other when playing poker face-to-face, what happens when a player sits next to another player while playing poker in VR? Is he/she aware of the presence of the other virtual players who are represented by the avatar? In short, the answer is yes, and the researchers will further explore this idea in section titled Social Presence.

In face-to-face Poker games, players are constantly aware of their opponents, and certain behaviors such as showing signs of nervousness, being pleased with a good hand, or having a bad day, or

even playing the game in a particular style, all these can be cues that Poker players use to their advantage. On this point, the researchers draw on Gibson's (1986) ecological psychology hypothesis. It investigates human awareness and activities in a specific context, such as the case of poker table.

In games and digital media, the Magic Circle, according to Linser et al. (2008), is a region in which the regular laws and realities of the actual world are suspended and replaced by the imagined reality of a gaming environment. However, as the researchers explain, this has not always been the case, since poker players bring their own abilities and experience into the virtual gaming arena, which is a liminal zone, or transitory stage that players go through when they are "out of this world." The players that were interviewed for this project demonstrated a strong sense of presence and were fully immersed in the game, which the researchers evaluated during the interviews. More information will be provided in subsequent sections.

For this study about poker players in virtual reality, the researchers will attempt to address two research questions:

- During immersion, do avatars have any influence on Poker player's gameplay?
- What cues can poker players find from their opponent during VR poker game play?

The researchers hope this study sheds some light and provides the groundwork for future studies. The next section introduces the theoretical framework used in this research while observing all poker participants in this experiment to draw a final conclusion.

THEORETICAL FRAMEWORK

Proteus Effects

According to Greek mythology, Proteus was a god who had the ability to alter himself into a variety of different figures and forms, the god of rivers and oceans. The Proteus Effect is defined as the process by which an individual adjusts their behavior based on what they feel others would see in them from a self-individual perspective (Yee & Bailenson 2007). It is the "tendency for people to be affected by their digital representations, such as avatars, dating site profiles and social networking personas" (Rouse, 2014, para. 1). Therefore, in the virtual world users have the capacity to modify their outward appearance and inner behavior by hiding behind an avatar in the virtual environment.

Social Presence

New social apps that are both more efficient and easier to use are being developed as computing and communication technology continue to evolve. These applications are designed to facilitate increased communication and engagement between users. The user interfaces of social media platforms and instant messaging applications, whether they run on desktop computers or mobile

phones, are undergoing continuous development in order to enhance the usability, experience, and engagement of users not only with the software itself, but also with users of other networks. Teleconferences with high-speed connections, mobile computers and phones with faster processing speeds, improved virtual reality camera lenses, advances in image quality techniques, and new technology innovations, are just some examples of social presence technologies. These technologies all have one feature in common: to enhance social presence.

According to Biocca and Harms (2002), "social presence is the moment-to-moment awareness of co-presence of a mediated body and the sense of accessibility of the other being's psychological, emotional, and intentional states" (p. 10). An individual gets the impression that they are there in the same physical or digital space with another person. Social presence centers on the socially mediated contact that one person has with another through the embodiment of technology.

Biocca and Harms (2002) divide social presence on three distinct levels: (1) Perceptual Level, (2) Subjective Level, or the psychobehavioral accessibility of the other, and the (3) Intersubjective Level. The most fundamental aspect of social presence is referred to be perceptual awareness, and it examines a person's awareness of another mediated person who is present in the same spatial space as them (co-presence). Does one player sense the presence of the other in a certain setting, and does the other player have the same experience?

The subjective level is a simulation of different individuals interacting inside the same virtual world (Biocca & Harms, 2002). When interacting with others in a virtual environment, users who are embodied in an avatar, for example, tend to simulate others as if the other person were themselves. This contrasts with the offline environment, in which users interact face-to-face and have direct access to physical and emotional cues. For instance, when a user encounters co-presence, she is made aware that someone else is also present and that attention is required in order to interact and connect with the other. Our engagement with the other mediated body might take place, or it might not, depending on how the other person responds. For instance, if we wave, the other person might or might not wave back. An interpretation of an emotional reaction can also be observed, such as when someone places both hands on their face and shakes their head to simulate crying, even though there are no tears falling from the virtual avatar, or when someone simply tilts their head to the side as a clue that they disapprove of something. These are some examples of how an emotional reaction can be interpreted.

Ecological Psychology (Virtual Reality Affordances)

Gibson (1986) was a visual perceptual psychologist who proposed an ecological approach to visual perception. His work draws attention to how people perceive what the physical environment affords the viewer. For example, a flat and rigid surface is perceived to afford support (e.g., hard, flat ground), whereas a steep surface is one that is perceived as affording "falling down." When applied to technology, this concept is important as it points to the possible relationship that a user may have with an object, or what activities a technological device may "afford" the user. Consider the following example: when looking at a steering wheel in a car, we perceive that this technology can afford turning, by moving it one way or the other. This theory points to the many ways that objects in the environment, or as is the focus of this study, technologies, afford perceived actions and behaviors.

Magic Circle

A game can only be named, when someone participates in it, when it is played (Gadamer, 1997). Games happen when we play, not the other way around, as Heidegger (2001) put it. As a result, we know that accessing any game with a prior absolute knowledge is impossible as even experienced poker players struggle at first when trying PokerVR until they got used to the environment and controls.

The VR poker room acts like a stage, where players of all skill levels may play, unlike other environments, such as a casino, where in the face-to-face environment less skilled players fear intimidation from other players. In VR, however, everyone is "masked" and represented through an avatar, a mask where they can rehearse and play as many times they want. A concept created by Dr. Jacob L. Moreno, called surplus reality, where "Through surplus reality a person is able to enter the unknown, live out their fantasies and become the creator of their own life." (Watersong, 2011).

The magic circle is sort of a social contract between the player and the game (Petry, 2013). For example, before beginning any game, players must agree on the space and rules they will follow. In digital games understanding the rules and correctly using controllers or keyboards is part of the game design, and this, is similar to the setting up of the social contract to begin the game. All players start on the table and follow the same poker gameplay rules, each holding different cards and stack of chips. The game programming can yield limitations to the poker player in VR room, but that does not stop players' participation in game play, but limitations on the accessories and level of avatar customization. However, it is this participation itself, as part of the human experience, that play affords infinite possibilities and is a reason why players join the game.

Liminality (The threshold)

Liminality, according to Turner (2005), is a term that has a number of common meanings. The inner process of rites of passage, such rituals conducted in many cultures to transition an individual from one stage of life to another, is characterized by liminality, or "being on the threshold." Liminality is the sensation of being caught in the middle. This concept is relevant for this research in Poker VR, as participants experienced a liminal phase, when they transcended from the real to the virtual world.

Petry (2013) suggests that when we think about a player, a game is reorganized from the viewpoint of the player, who establishes a "real" and special encounter with it, while the game concurrently communicates a certain concept or suggests an experimental situation—a zone that is out of the ordinary world. "This helps in explaining why different people have differing interpretations of playful situations – or even as to what counts as playful – as the protective psychological bubble is not uniform and shared, but personal" (Stenros, 2012, p. 11). Thus in poker, play and ritual are complementary, as players focus on their cards while performing their ritual by studying their opponent different patterns or body movements, searching for any cues or tells. However, in VR poker, players participate in an ephemeral activity by playing cards in a friendly environment with

other players in real time, wearing a "mask" disguising themselves through the avatar in order to win and illude the opponent, to live the experience and win the pot.

AVATAR

Avatar Poker Face

Virtual poker tables use animated 3D avatars, voice, sound effects, animation, and chat functions. Gambling-related visual representations do not appear in a vacuum; rather, they appear in context (Rose, 2001). Visual representations have the ability to both include and exclude people from social groups. According to Ingen (2008), some card rooms are comparable to a "global village," with poker players customizing their avatars and even adopting alien characters as their identities, able to adopt an alien identity. (Some levels of avatar customization are currently only available on the desktop, not in PokerVR for Oculus Quest 2.) Images aid in the comprehension of avatars in virtual poker because of their visual and textual arrangement.

Visual representations are critical on online poker sites as avatars are used to establish a player's identity. Avatars are the computer-generated representations of gamers that appear on-screen. After creating an account in a virtual space, players select an on-screen name and avatar based on the visual interface that is accessible to them. This allows them to play anonymously in the virtual space. Some poker websites, such as PokerStars, enable players to use their own photographs or pictures of themselves as on-screen representations of their opponents.

The images used in the development and reproduction of social difference, are "crucial in the production and reproduction of visions of social difference" (Rose, 2001, p. 15). A professional poker player's ability to read "tells," which are body gestures and other indicators that show what a player is thinking, is an important element of the trade. Because bluffing is a crucial tactic in poker, it is critical for players to maintain a strong "poker face," or an emotionless face and relaxed body language, so that their opponents do not pick up on any clues about the strength or weakness of their cards, as suggested by Ingen (2008) and confirmed by the players the researchers have interviewed.

RELATED WORK

Case Study: Any "Body" There? Avatar Visibility Effects in a Virtual Reality Game

Avatars can be used to connect with people, whether it's a static visual representation in video chat, a dynamic profile on certain social networking sites, or the narratively decided characters in a video game. Online (virtual) self-representations are not only "essential to what it is to have virtual identity" (Turkle, 2011, p. 272), but may also help us "experience and express unexplored aspects of the self" (Ionescu, 2013, p. 196). According to Spanlang et al. (2014), Virtual embodiment "describes the physical process that employs the Virtual Reality (VR) hardware and

software to substitute (parts of) a person's body with a virtual one" (p. 1). In other words, an avatar has become critical to our continued existence in the virtual reality environment. Many VR games are played in first- and third-person viewpoint using a VR HMD (Head Mounted Display) that synchronize the player's motions in the virtual environment along all axes.

Players may invest substantial time to customize their avatar in order to closely resemble their physical real-world body and appearance. As Trepte & Reinecke (2010) suggest, higher customization on one's avatars, increases the level of identification and enjoyment. Birk et al. (2016), "reported that identification with an avatar in a game will increase the intrinsic motivation of the player. They showed that similarity ("My character is like me in many ways"), embodied ("I feel like I am inside my character when playing"), and wishful identification ("I would like to be more like my character") increases autonomy, immersion, invested effort, enjoyment, and positive affect as well as the overall playing time." All of the poker players the researchers spoke with expressed an interest in participating because it was their first-time playing poker in VR, rather than a desire to win the game.

However, while playing poker in virtual reality during the experiment with real-time social contact with other players, several poker players believed that self-awareness was a significant component. This case study analyzes the different number body parts being displayed while immersed in a fast-paced intensive virtual reality game, and results shows that avatar body invisibility appears to be less significant in these cases when users are distracted with other things happening in game. All the participants from the researchers' VR poker experiment reported that they all become more comfortable with the VR headset, controllers, and virtual surroundings as they started to get used to the VR environment, and that they felt more immersed and deeper in the game flow.

METHODOLOGY

Introduction

The present study unpacks the affordance values through the avatar of a poker player while immersed in a virtual reality poker environment. The researchers recorded people's real-time social poker gaming interactions, including how their customized avatar affects their online appearance in the poker virtual world and what influences have if any in their in-gameplay decisions. It is interesting to see why certain users choose to personalize their virtual avatar in a certain way, what colors they use, what body type they choose, and what affects have on other virtual poker players, putting the proteus effects to the test consequently.

With the consent of the participants and after playing a game of PokerVR, participants were interviewed. The researchers explained the importance of their involvement, the interview's goals, and an opportunity for them share their VR experience. Interviews lasted from 25 minutes to an hour.

Procedure

This study involved two steps:

• Step 1: A total of six professional poker players were invited to play poker in virtual reality. In addition, —and as happens in this platform—there are always three to five other unknown and uninvited poker players joined the game.

• Step 2: Interviews.
All participants were invited for an interview to share their VR experience.

Each of the six participants played the same poker VR game in sequence. (They did not play jointly in VR.) The experiment began with a brief overview of the game, its objectives, the hardware components (HMD and controllers) used, and a guide to the questionnaire to be completed at the conclusion. Users were also informed that they could opt out of the study at any time. Following the initial presentation, each player began playing the game with minimum instructions with the intention to capture their first real Poker VR experience, transitioning from the real to virtual world. Throughout the game, the researchers analyzed and tracked the user's experience while the whole session was captured on video.

Participants

A total of six professional poker players with at least ten years' experience were recruited for this study. Professional poker players rather than amateurs were recruited because their poker experience that was crucial for this experiment. Yet none had previous experience playing poker in VR and one poker player did not participate in the VR poker experience, and they were not included in data analyzed for this study.

The average age of all five recruited players is 37.6 years old, with none having previously participated in Poker VR. The average number of years of live poker experience for all five players is 13.2 years on average.

Table 1. Player's gender, age, and poker experience.

Gender	Age	Years of Live Poker Experience	Previous Experience in Poker VR
Male (Player 1)	33	15	None
Male (Player 2)	30	12	None
Male (Player 3)	35	10	None
Female (Player 4)	50	14	None
Male (Player 5)	40	15	None

The PokerVR game is an open platform for all poker players who have access to an HMD to join and play the game. Random players (unknown people from the internet) join any available poker room to play poker and to interact with other players. The experiment focus was on the recruited poker players experience; therefore, little is known about the unknown players, however, this can be subject of future research.

Headset and Game Choice

The researchers chose Oculus Quest 2 headset due to its high screen resolution and game availability in online store. The headset is equipped with 2 x 6 DoF (Dept of Field) controllers that support both orientation and positional tracking and supports an area of 9ft x 9ft space with at least a 6.5 feet x 6.5 feet playable area free of obstructions, according to Oculus Device Specifications | Oculus Developers. (n.d.). However, since poker isn't a game of big body movements type of game, players will be seated all time on a comfortable chair playing PokerVR. PokerVR is a free poker game available online for Oculus headset owners, has a very clean user interface, nice relaxing virtual environment and a good community. All participants did not have much trouble when started the game.

Interviews

Before starting the interviews, the researchers clearly explained and reminded the recruited poker players the importance of their participation, the goals of the interview and also an opportunity for them to share their VR experience and ask questions. Interviews lasted between 25 minutes to 1 hour. Some interviews took longer as some participants were really excited while sharing their first-time poker VR experience. Participants were asked thirty-six questions, such as what cues or tells could a player see from other poker players during the PokerVR experience and if their own and other players avatars had any influence on their in-game play. Is poker a game of skills or luck while during PokerVR session, and all other asked questions were intended to extract players experience and their perception of poker in VR while immersed with their own customized avatar.

The complete list of questions asked is upon request.

RESULTS AND DATA ANALYSIS

Introduction

In this section the researchers condense, summarize, and evaluate the data analysis from two different data sets. The first are actions and in-game comments when playing PokerVR. The second come from interviews conducted with the players after the game.

Virtual Reality Poker Gameplay Analysis

For all five study participants, this was their first-time playing poker in VR. They began by completing the tasks that were necessary to play in this environment, such as picking an avatar, using the controllers, and moving through the virtual environment. In addition, short instructions were given to the users during the initial stage of the game— how to use the controllers to do certain activities in the game, such as how to pick up the cards, fold, or call. Otherwise, instruction was kept to the minimum so that they could explore on their own.

Participants spent approximately five minutes becoming acclimated to wearing the headsets (HMD) while adjusting it to their comfort. Participants said that they enjoyed using the HMD and navigating the VR Environment; however, they also said that using the controllers was difficult at first because it was their first-time experiencing Poker VR. Players maneuvered by aiming the hand controllers in the direction in which they desired to travel. In addition, when selecting the control button, a purple arch arrow was displayed from the controller heading to the desired destination, and the player was teleported to that area as seen in the following image:

Figure 1.
One of the research participants moving around and getting used with the hand controller in PokerVR (2021). In this moment, the player heading to Tournament area. Screenshot by Miguel

To turn around their virtual avatars, players used the joystick to go left or right, or they could turn their heads to gaze in different directions. Apart from the initial instructions, participants did not have access to a testing or training ground prior to playing. They only had one encounter with other players in the poker room, and had to learn how the controller works quickly in order to play the game. As stated before, the recruited players initially found it hard to get used to the hand controllers, that lead them to ask other (random) players while in-game session on how to pick up the cards, fold and other activities. All of the participants said that they enjoyed the game and found the help from other random online players to be helpful.

During the evaluation period of PokerVR for the Oculus Quest 2 HMD, players chose an avatar in the virtual wardrobe room: this is a designated space where users may look themselves in the mirror, along with a variety of options for gamers to select and customize their preferred avatar. However, three players found this difficult: one looked for an avatar with a bald head, a second player wanted an avatar with long black hair and sunglasses, and a third one did not express much interest in any of the avatars. And one player chose an avatar with purple hair, in order to stand out amid the poker players' crowd of friends.

When asked about selecting avatars, two participants said that even though the avatars do not have sunglasses and a hat, they are still recognizable. They also said that the current PokerVR avatar possibilities are restricted and that there is little difference between them. Three players said that while the appearance of the avatar is important, the most important aspects are the player's body language and the player's behaviors, as these are the cues that poker players watch to gain an advantage. In VR such cues can be disguised, as one said: "Some players put sunglasses or hats to avoid reading from other players." Another explained: "The VR has the advantage of hiding people anxiety and other signs." However, the researchers did not observe anxious behavior, and there was a lot of laughter and joy during the VR poker game play.

Professional poker players will focus on winning, using cues to gain an advantage over others, such as by watching how other players play their hands. When the researchers asked what players look for in other players, their responses pointed to one common theme: Play style. As an example of this, players are constantly on the lookout for their opponents' behavior, such as how their chips are stacked, or how they walk or move; scratching their heads as if they are thinking; moving their cards in anticipation of a fold; or their facial expressions in response to different scenarios; repeated behavior patterns that a player can use as a cue to take a better stance.

For example, one player said:

> I folded a few hands to that same person; and he did the exactly same thing, just head down, he had a lot of chips so he picked all the chips and just throw everything out, the guy. The first two hands we folded and that hand he was unlucky because I really had a hand, and he did exactly the same thing. Because we did not play with him for too long; but after the two similar hands we could tell already to pay attention to this player, might be a bluffer or something like that.

After the VR experience, all recruited players were asked if they found cues from other player's avatar, all said no, not from the avatar at least, but from the way other players played their hands (play style). Player 4 described her experience, while wondering, she was paying more attention to people who were talking less. For example, one player said:

> There were two or three players who did not speak when playing; they would just raise, call, or fold, making only slight motions which is how professional players act when playing face-to-face poker. there were people who did not talk while the game was in session, so these were the players that deserved more attention to when they raised a hand in order to get some cues, however, it was very hard because at the end it was an avatar and was hard to read through an avatar.

The researchers reduced the initial description of the game to a minimum so that they could experience the "Wow" factor when playing. Each player expressed excitement and happiness when asked to explain their first experience playing Poker VR. "What? They can hear me?" exclaimed Player 5 when first arriving at the poker virtual table. One participant said that they were conversing and asking questions of other random players from the internet, which they found to be encouraging.

It was possible to learn numerous tactics in this game, including how to call, fold, check, raise and throw cards on the table while also flipping the chips and engaging in other interactions. Player 5 jokingly said: "I found out I could punch someone." The most common and interesting aspect of all of the participants' experiences as the researchers observed them, was their social connection with other people. They said that they enjoyed engaging with other players while playing virtually.

Player 4 commented:

> The fun part is like, you can hear their voices and you are imagining the person behind this avatar, how old is he or how old is she, there was a she, she was a semi that ended up losing all her chips and you could tell she was a colored person by the way she spoke and her avatar also showed it and the way, she was so laid-back talking, like, my kids are whatever, just here for fun. Like, you could see the person, the way the person spoke was exactly the person behind the avatar.

Based on Player's 4 years of real-life poker experience, she attempts to depict a description on one of the random players that were on the same poker VR table with her during game play.

When it comes to overall preference between virtual reality (VR) and real-life poker interaction, every player had different opinion. While face-to-face you could strike up a deeper conversation, it is easier to approach someone in a virtual reality environment; however, this also depends how much each poker player enjoys socialize or get to know other poker players during game session.

Figure 2.
One of the research participants (Player 4) customizing her avatar in PokerVR (2021).
Screenshot by Miguel

All five participants reported that their own avatars had little influence on their in-game decisions on which card to play. Player 1 said: "Because in live poker you can see how people dress, what they wear and stuff like that. In the avatar world, you only see like a color and the facial expressions or some facial hair or something like that, but that doesn't affect that much. There's not really that much you can really do." He then said that in live poker, someone who dresses up is more likely to not mind losing a lot of money, which is a positive sign for him to play with them—as it is a sign of a poorly skilled player. But this difference in dress and appearance cannot be seen in virtual reality. A similar reply was given by Player 3: "I think the avatars are very similar, not enough variety even if you changed a little bit. The avatars are very focused on the same style, like the hair and colors, it felt like it all came from the same designer who made them for the game. There is not enough diversity." It was suggested that if PokerVR had more variety of avatars to choose from, like cartoon animations with different styles, perhaps could see different personalities from other players.

Participants explained that if VR avatars could be tied to the real person's identity, that would make a difference. For example, for Player 5, if Phil Ivey, one of the world's best professional poker players, used a recognizable avatar, he would have treated the game very seriously. This leads to the conclusion that avatar realism is an important aspect when it comes to PokerVR: four

players said that is important, with only one player saying no as he only plays online poker and does not use avatars. Visual identification may help players construct an association with the person behind the avatar, and impact the player's performance.

Player 4 reported an interesting finding during her experience:

> Do you actually see me smiling? and the guy was like, Yeah, I see you smile, that guy doesn't smile at all but we see you smile. That's why we said I'm curious, because the eyes of every player, the expression in the eyes, because when you're playing live like we told you, we kind of look into the eyes, how they are looking at their cards. I'm kind of looking at the person, so the eyes of each person had different expression which made me think, maybe the person behind it is doing an expression, kind eyes, not so kind eyes, we could actually see that.

Although PokerVR does not have many avatar customizations, it does offer facial expressions where players can show their mood. This was demonstrated (Time: 0:53:00) specially when Player 4 (the research participant) noticed player's A (random player from the internet) smiled and asked:

Player 4:	So, the avatar shows the facial expressions, like smiling
Random Player:	He (Player B) never smiles. Like, I can see you smile.
Player 4:	Ah? so you can see me smiling?
Random Player:	Yeah I see it.

PokerVR offers lifelike avatars that reproduces movement of the body and lips, such as when the player talks; this can enhance a sense of reality and believability. It can also serve as an important feature for players to read other players, as noted by Player 4.

Through the way people talk and their voice, players can get a lot of information just from it, such as, an idea if the other player is an older or younger player. For example, according to Player 5 own experience in real life poker, Scandinavian poker players are more aggressive in their gameplay. Understanding people backgrounds and fact checking is what makes poker so interesting, as you are constantly reading people.
One very crucial fact about Poker is that players are constantly observing each other, while some like to start a conversation with other players, some prefer to watch how other players play their cards. For example, when Player 4 was playing in VR, another player who sat next to her started to give compliments about her avatar hair and where she was from. As Player 3 and 5 mentioned, there was a connection within the avatar and the player's real voice which is the most important. According to them, through the person's voice, a person can know a lot about someone, if is a she or a he and have a guess where the other person came from by their accent. In VR, there are a lot of body language a real poker player can hide behind an avatar. However, people can still touch their faces, a cue (tell) of that player is nervous or not, if he is bluffing or has a strong hand.

The Magic Circle, the virtual space where players have crossed the liminal line between the real world into the virtual game, allow players to do and say things they would not normally do or say, or become someone entirely different from their real self. An example of this situation can be seen from Player 4 (the only female poker in the group), during her gameplay experience, when she

was verbally assaulted by another poker player in VR. As everyone was enjoying their time chatting with one another, (Around 1 hour and 15 minutes into the game), one of the random players started to verbally provoke all players by saying "Come on Putas". To the researchers best knowledge, Player 4 was the only female avatar on the poker table. ("Putas" in Portuguese means "bitch"). A different random player from the table asked if he knew what Puta meant. The random player with verbal insults replied with "it means Fucking Bitch. Puto means, you are a fucking pussy. Let's go Putas, let's go Putas". At this moment, the researchers stepped in and instructed the recruited poker player 4 if she was being bully, she could mute the annoying random player by pressing the option menu and choose Action, then the Mute Gun. The Mute Gun is an in-game feature where when you don't want to hear or talk with someone, you can pick up that virtual gun, point at the other player and shoot him / her, like playing a shooting game. In other cases, the player can also choose the freeze gun, which as the name implies, it freezes the player movements on your field of view.

Figure 3.
One of the research participants picking up the Mute gun to silence the other player whom were bullying her. (2021). Screenshot by Miguel

Other random players around the table said that they have muted the bully player before he left the game as he was very annoying. Later on, one of the random players said the bully was only 14 years old and there was no way to avoid kids under age to join the game. The researchers think this is a problem the game needs to address however a discussion for a separate paper. An effect that is felt and experienced by many online players across the gaming spectrum. When there is a

lose restriction felt by one experience when interacting online with other users, is known as the online disinhibition effect. (Suler, 2004). This effect can produce some negative disinhibition effects in some users or players in a virtual social environment like in PokerVR. According to some studies on videogame play (Konijn, Bijvank, & Bushman, 2007), teenagers who wishfully associate with violent characters in the virtual world can act more violently toward others in the real world. It's also been shown that an avatar's actions can influence real-world behavior in both prosocial and antisocial ways (Yoon & Vargas, 2014).

PokerVR game comes with these features exactly to avoid this sort of embarrassing situations. Players during in-game, when faced with players with bad attitudes, they have the option to choose to mute and freeze the other player. Mute will automatically silence the player and freeze will disable all interactions from other players with you, showing only a frozen avatar motionless.

In PokerVR, the most noticeable feature are player's hands. They can use them for a range of interactions with other players and in-game actions, such as throwing and picking up cards, making hand signs, playing with the chips. Players may also see each other's body posture and seating position; this makes the game seem more realistic.

Avatars are, as of this writing, the only means for players to construct an online digital form that accurately represents themselves, and they are restricted in the amount and quality of game elements that are made accessible to them by the game's developers.

Poker Players' Reflective Comments

Gamers were given the option to relax their eyes and psychologically return to life after completing the Poker VR gameplay experience, which took approximately ten minutes after completion. After they were comfortable, the researchers moved on to the interview, during which the researchers asked a series of thirty-six questions and collected all of the pertinent information they could find.

All poker players, it appears, share one quality in common: they don't take pleasure in losing a game of poker. According to the players, there are numerous aspects to poker that are enjoyable, including the possibility of winning money and interacting with others. The expression "poker is a game of one million mysteries" was used by one player. You're constantly attempting to read the other person's mind or deceive the other party into believing you have a hand in something, and the opposite is true. As Player 3 said: "If I was playing real money, I would have picked a friendlier, amateur tourist kind of avatar look so I would miss lead / deceive other poker players. Other professional players would want to play with me thinking I'm not a serious player and do mistakes along the way." It's a game of skill in which you must be able to interpret the cards as well as the body language of the other players. There are countless unknown barriers in this game. Others consider poker to be a social game in which you can meet new people while also relaxing; however, with virtual reality, it becomes much more enjoyable because you can play whenever you want by simply putting the HMD on your head.

According to players opinion, money is the primary motivator behind whether poker becomes a competitive game or is simply played for leisure. When the game becomes more competitive and real money is involved, the way people think about poker changes dramatically. As previously

said, the name of the poker player makes a difference in terms of how the players interact with one another. Also distinguishable is whether the wagering is done online, through an app, or in virtual reality. In addition to being more cautious and moving at a slower pace, live games are also more time-consuming than online multi-tabling poker games. With regard to virtual currencies, Player 5 made an excellent point when he says that because you cannot feel the weight of money, it is tempting for people to give less worth to it because it is virtual. However, in real-life poker, where players are playing for hundreds of thousands of dollars in prize money, the weight of their chips is felt, and this has a significant impact on the players' state of mind and actions. When real money is at stake, the playing styles of actual and simulated players are completely contradictory to one another.

Player 4 is concerned about the security of the game and the possibility of individuals cheating. Even though tables in actual online poker tournaments are monitored and supervised by experts, a player in Virtual Reality has no way of knowing whether or not another player is messaging the other player or working together against them, making cheating easy and uncontrollable.

For all participants players, poker is mostly a game of skill, with a small element of luck thrown in for good measure because it is a card game. Interesting enough, all players almost made the same comment, that you can have the worst cards ever, but if you have enough skills, then you can certainly read the other player's cards, probably make the fold on the better hand. However, when it comes to luck, you can be the best player in the world if you don't have luck, you lose anyways, it's just a matter of if you lose more or less, so luck is part of the game, but if you have skill you can control to not have luck destine the results as Player 4 commented. Player 2 and 5 shared similar opinions: "You are more skillful to play against new unskilled players, but if you are playing with people who are on the same level as you, then the luck involvement will be more."
Using PokerVR to train new players is comparable to using training simulations. New players can enter and play the game while remaining hidden behind an avatar and learning the rules of poker in real time. The abilities of the players evolve as they progress through the ranks. It will aid in the education of individuals, just as it does with many VR simulation training programs.

Figure 4.
One of the research participants hand while in game and about to check. The check symbol serves as a visual aid for the player to check (2021). Screenshot by Miguel

Throughout their virtual reality poker encounter, all of the participants were completely immersed and engaged with other players. Regarding gameplay, the researchers findings reveal that in virtual reality, the player's playing style and action pattern become the focal focus of the experience, which is also demonstrated as face-to-face poker. There was a significant sense of vividness across all of the participants' virtual reality encounters. According to McLuhan (1964), a strong vividness "extends one [or many] sense[s] in 'high definition." Suggested by Burdea & Coiffet (2003): Immersion, Interactivity and Imagination, also known as the three I's of VR, are three important characteristics of virtual reality technology.

All five participants claimed they experienced the feeling of immersion during PokerVR. When given a scale from 0 to 10 (0 = not immersed at all and 10 = completely immersed), the overall five players total score represents 7.8 points out of 10.

For example, when player four attempted to gaze into other players' eyes and imagined what people looked like behind their avatars using her imagination, while immersed and interacting with other players; also, when she reported that others were able to anticipate the type of players based on their voices (teenager or older player), also reported by other participants during VR session. Poker involves players' ability to perform successfully during a virtual reality simulation, which is primarily reliant on the human imagination and their years of poker experience, hence why the researchers recruited all professional poker players. The component of VR that deals with imagination is frequently used to refer to the ability of the mind to conceive things that can or not exist.

Figure 5.

The 3 I's: Imagination, Immersion and Interaction by Burdea and Coiffet (2003).
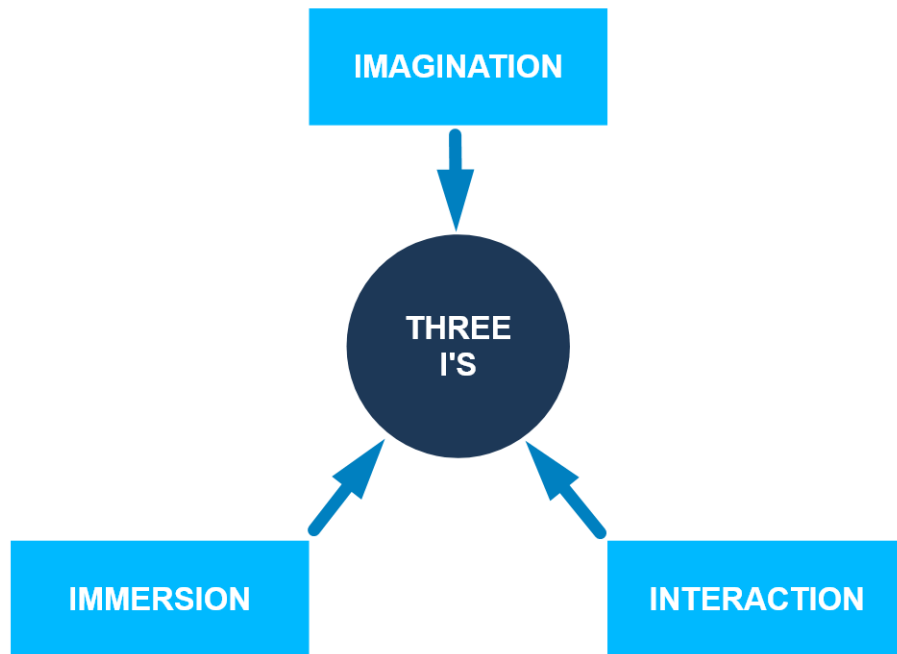
All participants had great memorable moments during the entire poker VR experience, two of the players most memorable moments were when playing poker and the cards they were holding, as Player 1 described it:

> The guys sat down with me on the river, he had King and Queen of hearts, and I had Jack and eight of clubs, the flop comes, Jack high with two hearts, he bets and I call, turn, blank, he bets I call, river heart, he bets I call and he has flush.

Also from Player 4:

> A hand that I won, I raised and there were a few players calling and a guy tried to bluff me and I just only called and I told him I had a 6, actually I already had a Full House, and he bet anyway and I won it all.

Meanwhile, Players 2, 3 and 5 reported that interaction with other players like making jokes and flipping chips were the key moments for them.

CONCLUSIONS AND PERSPECTIVES

Despite poker birthday remaining to be a mystery, it is believed that was the result from the fusion of the multi-cultural games towards time and space. From soldiers to presidents, from poor to rich, poker has always an excuse and reason for people to gather together to play the game. Since its inception, poker is played around the world and continues its expansion on multiple platforms, from real life to digital form.

According to the researchers findings, there are many facets of poker that make it fun, including winning, money, and social interaction. As one player put it, "poker is a game of a million mysteries." You are always trying to read the other person's mind or trick the other party into thinking you have a hand, and vice versa. It's a game of endless unknown obstacles, as well as a game of skill in which you must be able to read the cards and a player's body language. To others, poker is a game where you meet new people and just relax; but, in VR, it becomes more fun when you can play anytime you want by simply putting the HMD in your head.

With the HMDs on, players have a liminal period, a transition moment from the real world into the magic circle where they adjust themselves and follow the game mechanics, like movements and in-game features. From the researchers observation, players got acclimated to their new digital world quickly, with some players taking longer, but all managed to understand how the game worked.

Players customize their avatars when immersed in-game and the visible body parts in the game are hands, body and head. When given the option to show the whole arm length inside PokerVR, all participants agreed that it would make a difference. From being more realistic, the players can also see the other person's body posture, the way they sit. That can reveal a lot of information, "Your arms can speak a lot" as one participant said. In other situations, players can see movements anticipated from other players, like when the players are about to fold their cards and you can change your game strategy with this information.

However, the proteus effect in this study was not prominent. When players were asked if their own customized avatars influenced their in-game decisions, all said there was no influence. Despite the new adaptation and transition from real world poker into digital version of the game, none seemed to influence the players. That said, all poker participants enjoyed the newfound experience as they claimed. This leads us to be believe that despite from other in-game distractions, playing poker and winning the pot was still the main goal even thought this was all participants first time playing PokerVR.

All participants felt immersed in the game and brought their real-life poker skills into the digital space. While avatars are relevant in poker VR, the researchers concluded that reading cues from other players avatars is not yet enough for poker players in PokerVR. It has been, however, although being an avatar, experience poker players can still pick up cues from other poker players through their gaming performance, enforcing the idea that poker is in fact a game of skills. Avatars remain the only form for a player to represent themselves in the digital realm through different customizations depending on the game extension.

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