
My Body, My Avatar: How People Perceive Their Avatars in Social Virtual Reality

Guo Freeman

Clemson University
Clemson, SC 29634, USA
guof@clemson.edu

Alexandra Adkins

Clemson University
Clemson, SC 29634, USA
adkins4@g.clemson.edu

Samaneh Zamanifard

Clemson University
Clemson, SC 29634, USA
szamani@clemson.edu

Divine Maloney

Clemson University
Clemson, SC 29634, USA
divinem@clemson.edu

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the owner/author(s).
CHI '20 Extended Abstracts, April 25–30, 2020, Honolulu, HI, USA.
© 2020 Copyright is held by the author/owner(s).
ACM ISBN 978-1-4503-6819-3/20/04.
<https://doi.org/10.1145/3334480.3382923>

Abstract

The perception and experience of avatars has been critical to understand the social dynamics in virtual environments, online gaming, and collaborative systems. How would emerging sociotechnical systems further complicate the role of avatars in our online social lives? In this paper we focus on how people perceive and understand their avatars in social virtual reality (VR) - 3D virtual spaces where multiple users can interact with one another through VR head-mounted displays (HMDs). Based on 30 interviews, we identified three key themes emerging in people's perceptions and experiences of their avatars across various social VR applications. Our study contributes to further improving social VR technologies and better understanding emerging social interaction dynamics and consequences within social VR.

Author Keywords

avatar; social virtual reality; virtual worlds

CCS Concepts

•Human-centered computing → Empirical studies in collaborative and social computing;

Introduction

The perception and experience of avatars has been critical to understand the social dynamics in virtual environments,



Figure 1: A Virtual Reality Stand up Comedy in AltspaceVR (Source: www.youtube.com)



Figure 2: An on-screen avatar in Second Life (Source: www.rcg.org)

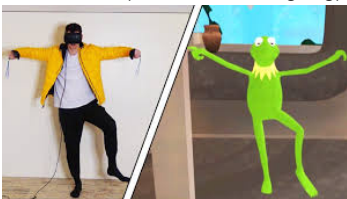


Figure 3: A full body tracking avatar in VRChat (Source: www.youtube.com)

online gaming, and collaborative systems, bringing together concerns on self-presentation, embodied interaction, and computer-mediated communication in HCI and CSCW. As Manninen and Kujanpää [12] posit, the main difference between virtual worlds and the physical world is the need for an avatar as a proxy for the player and all his/her possible communication conducted in the virtual environment.

In this sense, an avatar is one's interface to other human users, which requires a process of constantly reading and interpreting [7]. The expressions and movements performed by the players are translated through the avatar into the virtual game environment. Players also adjust their behavior and decide their responses based on the cues they interpreted from other avatars. However, with the constantly evolving social technologies and social needs, to what degree do emerging sociotechnical systems mediate and support more novel and complicated relationships between online users and their avatars? One such example is Social Virtual Reality (Social VR), an emerging novel sociotechnical system that is dramatically transforming how people meet, interact, and socialize online (Fig 1).

Grounded on our prior work on mediated communication and interaction in virtual worlds and social VR [4, 5, 6, 25], this work represents our first effort to explore the complicated dynamics surrounding avatar representation, identity management, and social interaction consequences in emerging social VR platforms. Specifically, we focus on this research question: *RQ: How do people perceive their avatars in social VR, especially compared to those in traditional virtual worlds and/or online games?*

Avatars, Virtual Worlds, and Social VR

Avatars play a significant role in most virtual worlds and online games. They act “as the nexus of virtual assets that the

player collects and produces while exploring online game worlds” [12]. In this sense, an avatar represents an online user's physical self and allow him/her to experience the activities and adventures of the virtual world via manipulating, crafting, and personalizing this “self” [3, 19]. By giving the avatar a sense of personality, unique behavior, intentions, and style, an online user starts to understand and attach himself/herself to the avatar as a second self, as something to protect and worry about, as one's role in the virtual world [7, 19]. This often leads to negative feelings of loss if one's avatar is under attack or dies [22]. Therefore, avatars play a central role in the communicative dynamics in virtual worlds [8, 10, 12]; they integrate several different social values such as gender roles and social norms [3, 16, 23]. They also afford the experimentation of completely new identities (e.g., cross-gender play) or reaffirmation of existing identities (e.g., queerness gameplay) [4, 5, 9, 18, 24].

In this paper we especially focus on how people perceive and understand their avatars in social VR, a novel virtual environment. Broadly defined, Social VR refers to 3D virtual spaces where multiple users can interact with one another through VR head-mounted displays (HMDs) [13, 14]. In the past five years, emerging Social VR applications, such as Facebook Spaces, VR Chat, AltspaceVR, and Rec Room, have rapidly grown in popularity. In most of applications, users can create, craft, and customize their avatars to enter the virtual spaces and interact with others. While other traditional 3D virtual worlds and online games mainly support avatar-mediated communication on screen, avatars in Social VR are powered by full body tracking, which fully immerses users in real-time and more embodied interaction that are similar to face-to-face communication, rather than merely looking at a computer screen (Fig 2 and 3). They also afford a broader spectrum of communication modes including both verbal and non-verbal interaction such as

Interviewee demographics

Gender: cis male - 21; cis female - 5; trans women - 4

Ethnicity: Caucasian - 21; African American - 2; Asian - 4; Latino - 2; N/A - 1.

Age: ranging from 18 to 65 (average age: 32.2)

Experiences of social VR: ranging from 5 months to 36 months (average: 18.7 months)

Experiences of social VR: ranging from 5 months to 36 months (average: 18.7 months)

Social VR applications experienced: Rec Room, VR Chat, AltspaceVR, High Fidelity, Facebook Spaces, Vtime, Engagae VR, Mozilla Hubs, Sonoroom, Pokerstar, Oculus Rooms, Sansar, Anyland

voice, gestures, proxemics, gaze, and facial expression. However, though the booming commercial social VR applications have led to an emerging research agenda in HCI and CSCW, social VR scholarship is at an infant stage.

Only a small body of work has explored new practices and phenomena surrounding social VR, including design strategies [11, 13, 20], communication and interaction modes [14, 15], and social interaction consequences [2, 25]. Especially, the role of avatars in social VR users' online social lives seems to be an understudied topic. A recent study by Baker et al. explored how older adults used social VR and embodied avatars as communication medium [1]. Yet more research is needed to examine how avatars are perceived by social VR users in general, leading to our research question at the beginning of this paper.

Methodology

This study is part of a broader research project on social experiences in social VR. To collect data, we conducted 30 semi-structured in-depth interviews via text or audio chat through Discord, Skype, or Google Hangouts based on participants' preferences from October 2019 to November 2019. The main interview questions were related to their social interactions and relationship building in social VR, important activities and social experiences they conduct in social VR, and perceptions and understandings of social VR affordance. The questions related to this study were: *How do you feel about creating your avatar in social VR? Did your experience of avatars in social VR differ from that in multiplayer online games or other virtual worlds, and why?*

We used an empirical, in-depth qualitative analysis that was used to code and interpret the data [21]. First, the first two authors closely read through the collected data to acquire

a sense of the whole picture as the role of avatars in social VR and collectively identified thematic topics and common features in the data for further analysis. Second, the first two authors carefully examined and reviewed the thematic topics and developed sub-themes. Finally, all four authors collaborated in an iterative coding process to discuss, combine, and refine themes and features to generate a rich description synthesizing users' perceptions of avatars in social VR.

Findings

Using quotes from participants' own accounts, in this section we present three key themes emerging in people's perceptions and experiences of their avatars across various social VR applications.

A More Challenging Way to Create and Craft Avatars

Comparing to traditional virtual worlds or online games, our participants noted that creating, crafting, and customizing their avatars in social VR was a much more challenging and time-consuming process. Such challenge often came from the relatively steep learning curve, required technical skills, and tensions between high demand for avatar personalization and limited features provided.

For example, P17 (Trans Woman, 26, White) explained how she had to navigate various technologies and processes and learn different new skills to create a desirable avatar in VR chat: *"The challenge is definitely the learning curves of 3d modeling and rigging bones and archers and then wait painting that and trying to make things optimized. And then you also have to learn how to import this into Unity. And then you have to learn how to like read the scripts, and get everything working. It's very, very complicated."* P15's (Male, 26, White) experience of creating avatars in RecRoom also echoed, *"[creating avatars] is*

quite a process. I had to watch tutorial after tutorial on how to even get it started. Once you do one, you get better at it faster and more fit. But from the basics up to the more advanced things, I had to look up everything because I just didn't know how to do it." For them, the fact that social VR being a relatively new and novel technology posed extra pressure and barriers to create their avatars – they not only had to get familiar with the new virtual environment but also needed to learn all new technologies and tools associated with it to create avatars.

Others also highlighted the tensions between high demand for avatar personalization and limited features provided in many existing social VR applications. Interestingly, most participants described the similarity to their physical appearance as a main criterion to create their avatars (more in next section). However, as emerging technological platforms, most applications only offered limited tools, making it challenging to create avatars who looked like themselves. P11 (Male, 21, white) explained, *"the challenge is to make the avatar look like me. There are limited tools such as shapes that you can use."* In particular, participants complained that most social VR applications only offered generic avatar designs, which even did not accommodate gender-specific features. For example, P21 (Female, 45, white) described her challenge to create a female look avatar in almost all popular social VR applications: *"most of the platforms, in terms of the facial features and the face, have a generic form. You look like a man unless you have long hair and unless you put some eyeshadow or something, But all the facial features are still quite rough. Even if you make these changes, your avatar still doesn't get a really female look."*

Despite these challenges, participants were confident that social VR platforms would eventually support a more nu-

anced avatar creation. Some already witnessed such improvements, as P7 (Male, 18, Asian) noted, *"my avatar should wear glasses because wearing glasses is a big part of my identity. A year and a half ago, there weren't glasses in AltspaceVR. When they finally updated the avatar customization, I feel I was more like myself because I was able to add glasses to my avatar."* P8 (Female, 27, white) also said, *"it definitely is difficult at first, but it's a fun challenge and it feels like it's worth it in the end to have the avatar finished and personalized for you."* For them, the challenge to create and craft avatars in social VR may not be a barrier to enter the space. Rather, it became part of the "fun" and accomplishment.

Body as the Immediate and Sole interface to Experience Avatars Participants also noted that they felt more engaging, intimate, and personal with their avatars in social VR in contrast to traditional virtual worlds and online games. As P22 (Male, 32, white) explained, he felt that his avatar in social VR was "truly an extension" of himself: *"With rec room, when you're creating the avatar, you're actually looking at it and you can move around and turn around. It's truly an extension of you. If it's in a normal game, it's not as engaged. I'll just find the first thing that's like kind of okay and go with it."*

Many attributed this feeling of engagement and intimacy to social VR's affordance of full body tracking. For example, P11 (Male, 21, white) highlighted the importance of movement correspondence to experiencing avatars in social VR: *"In a game you have avatars based on whatever game you're playing. So you are not like yourself but some character in the game. But in social VR, it's more than personal because it's like real life. In social VR your avatars' movements correspond to your physical body movements, whereas in a game you're controlling your avatars' move-*

ments on screen." According to P11, avatars in games were simply "characters" while in social VR, they became "real life". The ability to not only see but physically feel how his avatars and himself "mirror" made experiences of avatars in social VR appealing and intimate. P17 (Trans woman, 26, White) also added, *"the more tracking you get, the more presence you can add to the experience. This definitely creates a much stronger attachments and understanding to the avatar that you've created. It's not like just looking at a screen and then controlling it via keyboard and mouse as in an online game. You have much stronger attachment. And all your movements are completely tied to it. It's very powerful."* For P17, experiencing avatars in social VR seemed to be more valuable and powerful - instead of the traditional mechanism of keyboard and mouse controlling, the body itself became the immediate and sole interface between the user and the avatar, which fostered a much stronger sense of presence, embodiment, and attachment.

This intimate connection between one's physical body and one's avatar often resulted in the high demand to make avatars "personal" and similar to one's self, as P24 (female, 27, white) explained, *"when I play games outside of social VR, normally, I'll just choose whatever I think looks coolest when I choose an avatar. But when I'm in social VR, I actually usually try to do something that looks more like me."* P5 (Male, 29, White) also shared similar thoughts: *"I do tend to want my avatar to more represent me in VR. In a game like MMO, I just wanted to look what I would consider to be cool, but it doesn't have to be as much like me."* According to these quotes, while "being cool" was one of the most important considerations for many to create avatars in online gaming, "being myself" was central to avatars in social VR.

A More Engaging and Embodied Approach to Explore One's Own Identity

The previous section has pointed out the seemingly stronger attachment to one's avatar as well as the direct connection between one's body and his/her avatar. As a result, many participants considered experiencing avatars in social VR a more engaging and embodied approach to explore their own identity. This aspect was especially important for social VR users who might struggle with their gender identity and/or sexual identity. P3 (30, white), a trans woman, described that how experiencing a female avatar in social VR helped affirm her gender identity and encouraged her to make real life changes: *"Using a feminine avatar makes me confident not only in VR but also in real life. I feel like that would be actually more real than the real you in real life. Because in real life, you're stuck with what you were born with. But in VR, you can be what you truly feel like you are inside. This experience actually gave me confident to start my [transgender] procedure in the real life."*

In particular, P17 (26, white), another trans woman, emphasized the importance of the full body embodiment in her social VR avatar for discovering her gender identity: *"by using a feminine female avatar, I found that I was just more comfortable with that body, and it's kind of what I learned about my identity. That was the evidence to myself to consider which direction I wanted to take my actual body outside of the VR. If I found I was happy in VR about my body and I was not happy with my body outside of the VR, why not change it?"* In P17's case, her avatar in social VR provided her with a safe and low cost opportunity to fully experiment a female body. Such an ability to fully immerse in a different body and behave through it was invaluable to her, which also made her to reconsider and reevaluate her physical body and actual gender identity.

In addition, participants mentioned that their avatars in social VR helped them explore other undiscovered potentials of themselves. P18 (Male, 55, white) told a story about how he became good at talk shows: *"through my avatar, I've discovered some interesting aspect of myself that I don't think I would have otherwise, like I never thought I would become a host of a show on YouTube. But it feels so real when you do such things in social VR. That's I've discovered I'm really good at it. I think my avatar gives me confidence to discover more about myself."* For P18, this seemed to be an intertwining experience. On the one hand, he felt safe and confident to start new adventures in social VR because his presence and actions were mediated by his avatar. On the other hand, such an embodied experience through his avatar was so "real" that it led to changes and improvements on himself (e.g., becoming good at talk shows).

Discussion and Future Work

As our first endeavor to explore new challenges, phenomenon, and practices surrounding avatars in emerging social VR platforms, we have highlighted three findings that distinguish avatars in social VR from those in traditional virtual worlds and online gaming. First, social VR users considered creating and crafting avatars in social VR more challenging and highly technical but regarded such experience as fun and emotionally fulfilling. Second, they tend to feel more engaging, intimate, and personal with their avatars in social VR because their physical bodies became the immediate and sole interface between them and their avatars. Third, such a strong attachment also made them consider experiencing avatars in social VR a more engaging and embodied approach to explore their own identity.

Consistent with prior literature on avatars in traditional virtual worlds and online gaming [3, 4, 5, 8, 9, 10, 12, 16, 18, 23, 24], avatars in social VR still demonstrate similar social

functions. Social VR users communicate through avatars, create their avatars based on diverse social values, and use avatars to experiment new or existing identities. However, in our study, participants seemed to have a stronger identification with their avatars in social VR than in other platforms. They showed strong desires and great efforts to make their social VR avatars similar to themselves and often considered that their avatars were indeed themselves, not merely presentations of themselves. In contrast, they did not have the urge when creating avatars in traditional virtual worlds and online gaming.

Why do people perceive avatars in social VR more emotionally fulfilling, engaging, and intimate? Our study reveals that the direct connection between one's body and his/her avatar as well as the tremendous technical efforts to craft one's avatar in social VR would be potential reasons. We also see more work on answering this question worthy of research attention in HCI. In doing so, for future work we plan to build upon this current study to 1) explore social VR users' self-presentation practices and identity management mechanisms; 2) analyze how avatars affect social interaction consequences in social VR; and 3) investigate how experiences of avatars in social VR may differ from those of other human representations such as real-time photo-realistic/hologram virtual humans [17]. We hope that our study opens up new opportunities for HCI researchers and designers to further improve social VR technologies and better understand emerging social interaction dynamics and consequences.

ACKNOWLEDGMENTS

We thank Andrew Robb and our participants.

REFERENCES

- [1] Steven Baker, Ryan M Kelly, Jenny Waycott, Romina Carrasco, Thuong Hoang, Frances Batchelor, Elizabeth Ozanne, Briony Dow, Jeni Warburton, and Frank Vetere. 2019. Interrogating Social Virtual Reality as a Communication Medium for Older Adults. *Proceedings of the ACM on Human-Computer Interaction* 3, CSCW (2019), 1–24.
- [2] Lindsay Blackwell, Nicole Ellison, Natasha Elliott-Deflo, and Raz Schwartz. 2019. Harassment in Social Virtual Reality: Challenges for Platform Governance. *Proceedings of the ACM on Human-Computer Interaction* 3, CSCW (2019), 100.
- [3] Nicolas Ducheneaut, Ming-Hui Wen, Nicholas Yee, and Greg Wadley. 2009. Body and mind: a study of avatar personalization in three virtual worlds. In *Proceedings of the SIGCHI conference on human factors in computing systems*. ACM, 1151–1160.
- [4] Guo Freeman, Jeffrey Bardzell, and Shaowen Bardzell. 2016a. Revisiting computer-mediated intimacy: In-game marriage and dyadic gameplay in Audition. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*. ACM, 4325–4336.
- [5] Guo Freeman, Jeffrey Bardzell, Shaowen Bardzell, and Susan C Herring. 2015. Simulating marriage: Gender roles and emerging intimacy in an online game. In *Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing*. ACM, 1191–1200.
- [6] Guo Zhang Freeman, Jeffrey Bardzell, and Shaowen Bardzell. 2016b. Intimate experiences in virtual worlds: The interplay among hyperpersonal communication, avatar-based systems, and experiential drives. *IConference 2016 Proceedings* (2016).
- [7] Markus Friedl. 2002. *Online game interactivity theory with cdrom*. Charles River Media, Inc.
- [8] Maia Garau, Mel Slater, Simon Bee, and Martina Angela Sasse. 2001. The impact of eye gaze on communication using humanoid avatars. In *Proceedings of the SIGCHI conference on Human factors in computing systems*. ACM, 309–316.
- [9] Searle Huh and Dmitri Williams. 2010. Dude looks like a lady: Gender swapping in an online game. In *Online worlds: Convergence of the real and the virtual*. Springer, 161–174.
- [10] Kori M Inkpen and Mara Sedlins. 2011. Me and my avatar: exploring users' comfort with avatars for workplace communication. In *Proceedings of the ACM 2011 conference on Computer supported cooperative work*. ACM, 383–386.
- [11] Marcel Jonas, Steven Said, Daniel Yu, Chris Aiello, Nicholas Furlo, and Douglas Zytko. 2019. Towards a Taxonomy of Social VR Application Design. In *Extended Abstracts of the Annual Symposium on Computer-Human Interaction in Play Companion Extended Abstracts*. ACM, 437–444.
- [12] Tony Manninen and Tomi Kujanpää. 2007. The value of virtual assets: the role of game characters in MMOGs. *International Journal of Business Science & Applied Management (IJBSAM)* 2, 1 (2007), 21–33.
- [13] Joshua McVeigh-Schultz, Anya Kolesnichenko, and Katherine Isbister. 2019. Shaping Pro-Social Interaction in VR: An Emerging Design Framework. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*. ACM, 564.

- [14] Joshua McVeigh-Schultz, Elena Márquez Segura, Nick Merrill, and Katherine Isbister. 2018. What's It Mean to Be Social in VR?: Mapping the Social VR Design Ecology. In *Proceedings of the 2018 ACM Conference Companion Publication on Designing Interactive Systems*. ACM, 289–294.
- [15] Fares Moustafa and Anthony Steed. 2018. A longitudinal study of small group interaction in social virtual reality. In *Proceedings of the 24th ACM Symposium on Virtual Reality Software and Technology*. ACM, 22.
- [16] Kristine L Nowak and Christian Rauh. 2005. The influence of the avatar on online perceptions of anthropomorphism, androgyny, credibility, homophily, and attraction. *Journal of Computer-Mediated Communication* 11, 1 (2005), 153–178.
- [17] Sergio Orts-Escolano, Christoph Rhemann, Sean Fanello, Wayne Chang, Adarsh Kowdle, Yury Degtyarev, David Kim, Philip L Davidson, Sameh Khamis, Mingsong Dou, and others. 2016. Holoportation: Virtual 3d teleportation in real-time. In *Proceedings of the 29th Annual Symposium on User Interface Software and Technology*. 741–754.
- [18] Bonnie Ruberg and Adrienne Shaw. 2017. *Queer game studies*. U of Minnesota Press.
- [19] Ralph Schroeder. 2012. *The social life of avatars: Presence and interaction in shared virtual environments*. Springer Science & Business Media.
- [20] Misha Sra, Aske Mottelson, and Pattie Maes. 2018. Your place and mine: Designing a shared VR experience for remotely located users. In *Proceedings of the 2018 Designing Interactive Systems Conference*. ACM, 85–97.
- [21] Anselm L Strauss. 1987. *Qualitative analysis for social scientists*. Cambridge university press.
- [22] Jessica Wolfendale. 2007. My avatar, my self: Virtual harm and attachment. *Ethics and information technology* 9, 2 (2007), 111–119.
- [23] Nick Yee, Jeremy N Bailenson, Mark Urbanek, Francis Chang, and Dan Merget. 2007. The unbearable likeness of being digital: The persistence of nonverbal social norms in online virtual environments. *CyberPsychology & Behavior* 10, 1 (2007), 115–121.
- [24] Nick Yee, Nicolas Ducheneaut, Mike Yao, and Les Nelson. 2011. Do men heal more when in drag?: conflicting identity cues between user and avatar. In *Proceedings of the SIGCHI conference on Human factors in computing systems*. ACM, 773–776.
- [25] Samaneh Zamanifard and Guo Freeman. 2019. "The Togetherness that We Crave": Experiencing Social VR in Long Distance Relationships. In *Conference Companion Publication of the 2019 on Computer Supported Cooperative Work and Social Computing*. ACM, 438–442.