



A Surprise Birthday Party in VR: Leveraging Social Virtual Reality to Maintain Existing Close Ties over Distance

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Abstract. This paper explores how social virtual reality, a novel 3D virtual social interaction space that provides embodied and immersive experiences, can be leveraged to maintain existing close interpersonal relationships over distance. Based on 672 Reddit posts and comments, our findings show that in addition to initiating and building new relationships with online strangers, social VR platforms' unique features, including physicality, the enhanced sense of presence, and the broad range of shared embodied activities, can also help maintain various types of established close ties (e.g., parent-child, friends, siblings, and romantic partners) over distance in a nuanced way. This work contributes to understanding the increasingly important role of social VR in innovating modern computer-mediated relationships and can inform the future design of social VR to better support people's social needs and interpersonal connections.

Keywords: Social VR · Interpersonal relationships · Computer-mediated relationships · Close ties

1 Introduction

Actively maintaining various forms of existing close interpersonal relationships is not only the most important psychological and behavioral dynamics of loving and caring for others [27] but also significantly affects people's social lives and daily performance [1, 12, 42]. In modern social lives, varied communication technologies have been widely used to sustain such relationships, especially over distance, including emails [28, 55], text messages [15, 25], video chats [38, 40], social networking sites [4, 7, 13, 14, 26, 48], and online gaming [31, 43]. However, prior research also reveals two shortcomings in maintaining existing close ties over distance through these technologies: (1) they often mainly focus on facilitating text, video, or voice communication but lack considerations of crucial experiential qualities; and (2) they often fall short of providing embodiment and immersive experiences that simulate everyday face-to-face activities, which are crucial to maintain existing close ties [6, 21, 37, 46, 47, 52].

In this paper we focus on how social virtual reality (VR), a 3D virtual ecosystem where multiple users can socialize and interact with each other through head-mounted displays [32, 35] (Figs. 1 and 2), can be leveraged to address these limitations by maintaining and sustaining existing close interpersonal relationships over distance in a nuanced way. While investigating social dynamics and relationship building in social VR is becoming a growing research agenda in computing and Human-Computer Interaction studies, existing work tends to focus on building and fostering relationships among online strangers through social VR [2, 16, 33, 54]. Yet, little is known about how social VR may also be used to support existing interpersonal relationships over distance, which may demonstrate different nature, dynamics, and impacts on one's social life and psychological well-being compared to interacting with strangers.



Fig. 1. AltspaceVR (<https://www.altvr.com/>)



Fig. 2. VRChat (<https://www.vrchat.com/>)

Therefore, based on 672 Reddit posts and comments about social VR users' experiences of using social VR to maintain their existing close social relationships, we explore three research questions:

RQ1: What types of existing relationships do people use social VR to maintain?

RQ2: In which ways do they use social VR to maintain such relationships?

RQ3: What are some potential risks when using social VR to maintain such relationships?

This work thus contributes to understanding the increasingly important role of social VR in modern social lives. We extend existing social VR literature by (1) focusing on existing social connections rather than new relationships between strangers, and (2) by providing new empirical evidence of how social VR can be leveraged to benefit various close ties over distance, such as parent-child, friendships, and romance, as well as potential risks. Our work contributes towards a better understanding of modern computer-mediated relationships and informs the future design of social VR to better support people's everyday social lives and interpersonal connections.

2 Computer-Mediated Relationships and Social VR

Belongingness is essential for maintaining people's psychological well-being [5, 22]. Keeping connections with those one cares for and loves can also significantly affect one's mental health [5, 12, 29, 42]. Most traditional social science studies appear to agree that an interpersonal relationship refers to a strong, deep, or close association/acquaintance between two or more people, involving experiences that range from the mundane to the aesthetic [49], and as a specific sort of knowing, loving, and caring for a person [27]. Such relationships are demonstrated as various forms such as friendship (a freely chosen association), family (which establishes roles and identities), and romance (based on passion, intimacy, and commitment).

However, in today's modern society, many people are forced to live separately from their close ties for various reasons, such as education, career, military, or simply moving away from family. It has been reported that millions of Americans are involved in Long Distance Relationships (LDRs) with their lovers, parents, friends, children, siblings, or other relatives [53]. Therefore, people often rely on various computer-mediated methods to stay connected with their geographically separated close ties. First, people tend to use technologies to compensate for face-to-face communication with their remote existing close ties, such as via emails, instant messages, phone calls, and social networking sites [10, 14, 45, 56]. These technologies have been used to maintain various types of close bonds, including parent-child [13], couples [7], friends [26], and grandparent-grandchild [4]. However, in contrast with face-to-face communication, these technologies lack critical mechanisms for intimacy building that often happen in offline interaction [30, 50, 51].

Second, in addition to fulfilling communication needs, maintaining existing close ties also requires a sense of closeness and being a part of each other's daily activities despite from a distance. As a result, technologies for simulating physical connections [6, 21, 37, 46, 47, 52] and shared activities [9, 20, 24, 39, 41, 43, 44, 58, 59] have been used for sustaining existing close ties over distance, such as touching during a phone conversation [46], haptic device to simulate a kiss [50], cooking together through wearable devices [9], and playing puzzle games together [43]. Yet, many existing technologies seem to provide limited support for certain essential experiential qualities that are crucial for maintaining existing close ties, including physical touch, body language, shared memories, and collaborative activities as daily routine [17, 19, 37, 38]. There also seem to be limited solutions for providing embodied and immersive experiences to resemble daily offline world activities (e.g., dancing, dating, and playing sports together), which significantly influence existing close relationships.

In this paper, we focus on the potential of social VR to address the above-mentioned issues in maintaining existing close ties over distance. In social VR, users can create and customize partially or fully body tracked avatars (i.e., their avatar body corresponds to their body movement in the offline world in real-time) and interact and socialize with each other through such avatars. In doing so, social VR users are able to conduct and enjoy social activities in a highly

realistic 3D virtual environment similar to a face-to-face manner, such as walking in a public place, watching a movie, playing games, participating in a concert, and having a party. Social VR also provides other nuanced technological features such as sense of presence, body tracking, synchronous voice conversation, and the simulated touching features, making it unique compared to traditional communication technologies [35,36]. Popular social VR platforms include VRchat, Rec Room, Bigscreen, AltspaceVR, Meta Horizon, and so forth. They tend to afford diverse activities and social atmospheres. For example, Rec Room focuses on VR gaming; VR Chat supports a wide range of creative activities and avatar customization; AltspaceVR is well known for its diverse event and professional development, and High Fidelity VR highlights large-scale public events and performance [35].

Acknowledging the nuances of social VR spaces, there has been a growing research agenda in HCI to investigate interaction dynamics and relationship building in social VR [2,8,16,54]. Most existing social VR research on relationship building tends to focus on how this technology is leveraged to initiate and build relationships between online strangers. Nevertheless, little is known about how it can also be used to maintain existing close relationships over distance, which may significantly differ from meeting and fostering new interpersonal bonds. This paper thus aims to expand prior research regarding relationship building in social VR by focusing on how social VR can be used to maintain various types of existing close interpersonal relationships and potential risks in this process.

3 Methods

Data Collection. We focus on first-person and narrative accounts of people’s experiences of using various social VR applications to maintain and support their existing close ties over distance. Many social VR users highly engage in popular online forums to share their experiences of VR with others who have similar experiences. Therefore, to collect data, we used keyword search (e.g., family, friend, sibling, etc.)¹ on 18 social VR related subreddits on Reddit (e.g., r/VRchat, r/bigscreen, etc.)², a popular international online forum to share opinions and personal stories, to collect posts and comments regarding how people experience social VR in their existing close ties over distance. Once the initial dataset was collected, we read through each collected post and comment to filter out irrelevant posts (e.g., a post about buying a VR headset for parents but not about

¹ List of keywords contains: Long distance relationship, LDR, parent, family, father, dad, bf, mother, mom, daughter, son, grandma, grandpa, grandparent, brother, sister, sibling, cousin, friends, friendship, boyfriend, gf, girlfriend, husband, fiancée, wife, keep in touch, maintain a relationship, stay connected.

² Subreddits used in this research include: r/AltspaceVR, r/VRchat, r/Anyland, r/bigscreen, r/ChilloutVR, r/FacebookHorizons, r/HighFidelity, r/LDR, r/LongDistance, r/OculusQuest, r/oculus, r/RecRoom, r/RecRoomVR, r/sansar, r/SocialVR, r/TheWaveVr, r/vTime, and r/Coronavirus.

engaging in social VR together with parents) and redundant data (e.g., posts including more than one keywords, for instance, “I watched a movie with my daughter and son”). As a result, 672 posts and comments were used for further analysis. Despite using public Reddit data, we removed any possibly identifiable information from the dataset (e.g., usernames) to protect Reddit users’ privacy.

Data Analysis. We then conducted an in-depth qualitative analysis of the collected data [11]. First, the first author closely read through the collected data line by line to have a whole picture of how people use social VR to maintain existing close relationships with others. Second, the first author identified a set of initial themes emerging in the data that can be used to answer our RQs through open coding [11], including types of close relationships that people use social VR to maintain (RQ1), how exactly they use social VR to stay connected with their geographically separated close ties (RQ2), and potential risks in this process (RQ3). Finally, both authors iteratively and collaboratively synthesized and revised these themes through axial coding and focused coding [11] to provide a rich description about the role of social VR in maintaining existing close ties over distance.

4 Findings

In this section, we first describe the types of existing close relationships that people often use social VR to maintain and support (RQ1). We then identify three ways through which social VR can be leveraged to maintain such relationships (RQ2). We also highlight potential privacy risks emerging in this process (RQ3).

4.1 Social VR-Supported Existing Close Ties

Our findings show that social VR, beyond just building relationships among strangers, indeed can be leveraged to maintain almost all types of existing close relationships over distance, including family relationships (e.g., with parents, children, and siblings), friendships, and romantic relationships.

Sustain Family Relationships over Distance. Many posts highlight that social VR helps people stay connected with family members such as parents, children, and siblings even when they are not in the same location. For example, a user commented that they used social VR to communicate and have fun with their sibling who was not co-located with them: *“I use Altspace to hang out with my sister who lives across the country.”* Another user appreciated how AltspaceVR helped them connect with their son: *“I use Altspace to meet and chat with my son in Germany. There are some great worlds for us to wander around in together. I’m also looking into building a world for some events In October. I think it has great potential.”* For this user, social VR gave them the opportunity to stay connected with their son, who lived in a different country, by embarking family journeys together remotely. This user also mentioned their plan to have a family party in AltspaceVR in the future.

In particular, some posts highlight the importance of leveraging social VR to stay connected with family members during the global COVID-19 pandemic: *“I just want to say how thankful I am right now to have recroom to meet up with my millennial kids each day to play paintball together in this time of social isolation. We are in 3 different states, and one is in another country. We are having the best time; 2 or 3 of us partied up in regular games, 4 or 5 of us in private team battles, nearly every day this week. It means a lot to me.”* According to the user, though the pandemic posed significant challenges on travels and face-to-face meetings, their family across several US states were still able to engage in various family activities (e.g., playing games together) regularly through social VR platforms such as Rec Room, which helped them maintain connections while people could not travel to visit each other.

Keep Friendship Alive Remotely. Social VR is also beneficial for maintaining existing friendships despite people not being geographically co-located. A user explained how they still could connect with their friends in Rec Room after they moved away: *“This platform actually helped me stay in touch with my best friend after they moved to another state.”* Similar to how social VR helps family members stay connected during the global COVID-19 pandemic, it also helps people maintain their existing friendships during lock-down: *“As someone who has been VERY isolated the past year due to the pandemic, vr has made it a breeze. My friends all bought headsets and I even bought 2 for some other friends. We have weekly hangouts in VR and sometimes even more. I recommend it.”* For these users, in a unique situation like COVID when people are asked to keep social distance and reduce face-to-face meetings, social VR provides valuable opportunities for safe social gatherings with friends in a highly immersive virtual world.

In particular, compared to traditional social media, social VR does not limit users to just texting, video calls, or playing a specific game. Rather, in social VR, users are able to engage in various types of social experiences that resemble real-life activities with their friends, as this post shared: *“Me and a friend have just spent the best part of 2h or so switching rooms, trying out 3D movies, playing games, and browsing youtube. All the things that make Bigscreen great (and it really is).”* According to this post, the variety of activities that social VR provides and their similarity to offline social activities significantly benefit maintaining friendships even over distance, which we will also discuss in Sect. 4.2.

Stay Connected with Long Distance Romantic Partners. Our data also show that social VR is commonly used to maintain long-distance romantic relationships. For example, a user shared their experiences in VRChat: *“I got my long-distance boyfriend a Quest 2 just to play VRChat together, and we’ve been having an absolute blast together.”* VRChat helped this couple have an amusing or thrilling experience while they could not be together physically. For them, social VR seems to mitigate the geographical barrier and help them build a sense of physical togetherness. Another user shared a similar sentiment about

how social VR helped them maintain their long-distance romantic relationship: *“We actually didn’t meet in VRC. We met in the Rec Room. But still, VRChat has definitely made our relationship stronger. VR is an amazing thing for long-distance relationships!”* This user appreciated how social VR, such as VRChat and Rec Room, not only allowed them to start a long distance romantic relationship but also helped them maintain the romance over distance. They even commented that engaging in social VR could make their relationships “stronger” while they were not physically co-located.

4.2 Using Social VR to Maintain Existing Close Ties

As Reddit users acknowledge that social VR can be leveraged to maintain various types of existing close relationships, they also highlight several ways through which social VR makes this happen.

Building a Sense of Physically Being Together. In VR, presence is a subjective feeling that a user has a sense of being in the mediated virtual environment [57]. In our data, users commented that they were able to build a sense of physically being together because of the use of a motion-controlled avatar with a complete representation of the avatar body [23]. Building this sense of physical togetherness thus becomes a significant way to maintain their existing close ties over distance. One post described: *“It’s a long-distance relationship at this point. VRChat helps because we can do more things together than if there wasn’t VRChat. It’s as close as we can be together without actually being together.”* According to this poster, VRChat helped their long distance romantic relationship in a way similar to face-to-face communication, which led to a strong sense of physical togetherness without being physically co-located (*“as we can be together without actually being together”*). Another post shared a similar story about how VRChat helped their family mitigate distance by creating a sense of physical closeness: *“VRChat lets me stay in touch with my parents. My mom got me and my dad a headset each as a Christmas present. And with me studying abroad, VRChat helps make the distance between us feel not so big.”*

Especially, a poster well summarized how the sense of physically being together in social VR differs from that in other social platforms: *“It gives a focused presence. While you might not be able to see your friends’ faces, you can hear their voices and see their avatars. You’re ‘present’ with them in a space, as opposed to a Discord or Teams or Zoom or whatever call. There you are, ‘present,’ but you’re looking at a screen, and you have all the distractions of the real space you’re in. Like the Facebook chat with other people, that recipe you wanted to look up or something on your floor...In the VR space, you’re focused on the interaction with your friends more - being social around the things you normally would when watching a movie, or a show, or showing vacation photos, but are probably prevented from doing now because of covid or because your friend lives far away.”* According to this user, in contrast to traditional social networking platforms such as Facebook and Whatsapp, where users interact through

text, audio, and videos, social VR introduces a new form of communication by combining one's physical body with an avatar body in an immersive way. As a result, instead of simply "viewing" their communication on a computer screen, social VR users seem to have a stronger sense of presence and co-presence with others due to full body tracked avatars and the resembled face-to-face communication. Both features contribute to maintaining a solid close tie even over distance.

Facilitating Physical Contacts to Recall Familiar Moments. Social VR offers a combination of technological uniqueness such as embodied avatar, full-body tracking, and a broader spectrum of communication modes, including verbal and non-verbal interactions such as voice, gestures, proxemics, gaze, and facial expression. These unique features thus help people to recall familiar moments they cherish in their existing close ties through simulated physical contacts. A user shared their experience in VRChat: *"VRChat allows for a sense of intimacy that is hard to describe. Obviously, you're not actually sitting right beside your important person, nuzzling and cuddling with them, but VRChat can do a particularly amazing job at tricking the brain into thinking you are. Laying out in the full body in front of a mirror in a quiet room with my important person, hugging a pillow and pretending it's them, it all combines to make you feel like you are really together, as much as you can be while being apart."* This poster were able to leverage multiple social VR features to recall and re-create valuable personal moments with their loved ones: they were able to stay in a quiet and private virtual room together, simulate the action of hugging by full body tracking (e.g., hugging in VR requires moving one's physical body in the offline world to hug, such as hug a pillow), and see their actions through a virtual mirror. All of these add important physicality to the VR-mediated virtual experiences, making such experiences more vivid, realistic, and similar to those moments that happened in the offline world before.

Another user shared a similar story: *"Usually, it's a few hours of playing VRChat with other friends first, and then another 1 to 2h of just us two looking for cozy/beautiful/interesting worlds and chatting. Last night we found a very scenic Japanese shrine or something and chatted for about an hour while she kinda sat in front of me, and I had my arms around her waist."* This poster pointed out how VRChat helped him and his long distance romantic partner physically and experientially recreate physical intimacy and reminded them of similar moments they spent together in the offline world before (e.g., *"I had my arms around her waist"*).

Simulating Offline Activities to Create New Shared Memories. Reddit users also highlight how social VR helps them create new shared memories with their close ties as they can engage in various simulated social activities that resemble offline social gatherings, such as traveling, playing games, hosting parties, sharing meals, and watching movies. They especially mention two types of activities that significantly help them stay connected with their family

members, friends, and romantic partners over distance: watching movies together and engaging in immersive bonding social events.

1. Watching movies together. In social VR, users can watch a movie together either in a public place that resembles a movie theatre, or in a private room that simulate watching a movie with friends at home (Fig. 3). For example, a father shared how he could watch movies in Big Screen with their children, who were geographically separated: *“My children live on the west coast, and my other children and I live on the east coast. The big screen provides the opportunity for all of us to ‘go to the movies’ together and talk. It had been the best movie experience I’ve had with my family... ever!!!.”* For this users, social VR is not merely a virtual place to meet up and hang out. Rather, the value of social VR lies in how it can seamlessly resemble family bonding activities, such as watching movies with his children. While this family could not get together in the offline world due to distance issues, watching a movie together in social VR is a comparable, or even better, family gathering experience.

Watching movies together is also important to people who want to use social VR to maintain existing friendships or romantic relationships. One post mentioned, *“Him and I ended up building a world together for ourselves with a video player and furniture so we have our movie nights in VR. It’s cool too being able to invite friends over and just hang out in what is essentially our house.”* This couple not only designed and created their own personal space in VRChat as their “house” but also were able to watch movies together in their house either with each other or with their friends. For them, this is similar to hosting a movie watch party or enjoying personal time together in their house in the offline world.



Fig. 3. Watching a movie together in Big Screen (Source: <https://www.bigscreenvr.com/>)

2. Engaging in immersive bonding social events. Many social VR platforms allow users to design and create their own private spaces, invite guests, and host immersive social events. Many users thus leverage such features to engage in various types of bonding events with their existing close ties. One user posted, *“Serenity Cove is a great place for hanging out with friends. I have parties there*

with my friends every single night, and before we end off our nights, we always go to the secret cave up top inside the skull and just stare at the beautiful sunset background and talk." This user used one pre-designed virtual place in social VR to spend time with their friends (e.g., enjoying the sunset), relax, and reinforce their bonding.

Others also hold special events such as birthday parties in social VR to hang out with friends and loved ones. One user posted, *"He threw me a virtual reality surprise birthday party in VRChat with all my friends; we shot fireworks, played laser tag, and did an escape room. When we got off of VR, we called each other and just had fun talking to each other until we fell asleep. His present to me was a video that he made with a slide show of our memories together and coordinating the party and everything. It was a good day."* In this example, when people are geographically separated and cannot spend special days such as birthdays together, social VR becomes a satisfactory alternative. This poster was able to have a birthday party with friends in a way similar to how their birthday party could have been held offline – fireworks and games. These virtual activities also seem to become new shared memories that they cherish, as shown in how such events are recorded and documented (e.g., as video recordings and slideshows).

4.3 Privacy Concerns Regarding Maintain Existing Relationships Through Social VR

As our findings have shown, Reddit users in general consider using social VR to maintain various types of existing close relationships a positive and beneficial experience. However, they also express several issues, especially regarding emergent privacy concerns, in this process.

Above all, in order to use social VR services and enjoy its full technical features, certain self-disclosure is almost mandatory. For example, users have to give up part of their personal information such as voice, gestures, facial expressions, and body movements to engage in immersive and embodied interactions in social VR [34]. In this sense, maintaining existing relationships in social VR may inevitably leak personal information regarding one's offline identity, especially when people interact with their existing close ties in public social VR places. One poster complained, *"[In social VR], my friend would NONSTOP use my real name, our location, etc. as a way to kind of 'brag' about how close we are. This has become an issue to me."* In this example, this poster's offline friend revealed important personal information about them without consent, including real life names and locations. For this poster, this may become a serious privacy issue as online strangers may overhear their conversations and get to know their offline identities.

Another poster shared a similar experience, *"I met these two very nice people who I became quite close with. Then suddenly my friend from real life joins and fucking starts ruining it for me. He starts off by calling me by my real name, talking about how we go to the same school and stuff like that, and that bothers me a lot. Me and the people I just met decide to join a new world, suddenly he appears outta nowhere ruining the mood once again."* This example shows how

privacy issues in social VR may lead to certain conflicts between the VR world and the offline world. On the one hand, this poster's friend revealed personal information about the user's offline identity, which violated their privacy. On the other hand, the friend followed the poster around and kept interrupting this poster's online interaction with others. As a result, tensions may emerge between this poster's offline life (e.g., existing social connections) and VR life (e.g., making new friends in social VR).

This type of privacy concern when using social VR for existing close ties is not only limited to people who are offline friends. A user shared how their sibling revealed personal information about them: *"I had a real big problem playing games with my big sister because she kept calling me by my real name in front of everybody. Not to mention she kind of cramped my style."* According to this poster, using social VR to maintain existing close ties seems to lead to a double privacy challenge: while they already have difficulties in protecting their personal information (e.g., have to use voice in social VR), they also need to ensure that people whom they know in the offline world (e.g., friends and family members) do not accidental or intentionally reveal their offline identities.

5 Discussion

Grounded in our findings, in this section we first discuss how our research sheds light on unique ways through which social VR may address the limitations of conventional communication technologies to innovate modern computer-mediated relationships and better support and maintain existing close ties over distance. We then identify potential design directions to further support existing relationships through social VR.

5.1 Innovating Modern Computer-Mediated Relationships Through Social VR

As prior literature has shown, on the one hand, traditional computer-mediated relationships often lack tangible aspects of offline interaction [30, 50, 51]. On the other hand, even some technologies exist for simulating physical offline experiences (e.g., touching) [6, 21, 37, 46, 47, 52], they are still limited in terms of their support for body language, shared memories, and collaborative activities as a daily routine, which play crucial roles in sustaining close interpersonal bonds. Therefore, one important insight from our findings lies in the unique ways through which social VR may address the two main limitations of conventional communication technologies for mediating existing offline relationships. This is especially valuable during the COVID-19 pandemic, where social distancing and lockdowns placed additional challenges for close ties over distance.

First, when using traditional on-screen social media to maintain existing close ties, people often lack a sense of physical closeness [6, 21, 37, 46, 47, 52]. In contrast, social VR users leverage a combination of motion-controlled avatars with partial or full body tracking features and synchronous voice communication

to build a sense of being physically together. This unique combination thus adds crucial experiential qualities (e.g., “being together”) to their effort to maintain existing close ties.

Second, while conventional on-screen communication technologies often lacks the capability to simulate face-to-face collaborative activities [9,20,24,39,41,43,44,58,59] social VR addresses these issues by offering unique physicalized experiences through embodied immersive events and non-verbal interactions such as gestures, proxemics, gaze, and facial expression. These features thus help users engage in shared activities and create new memories similar to face to face interaction while they are not co-located. For example, our findings show that social VR users feel that hugging, nuzzling, kissing, and cuddling with their loved ones in social VR (e.g., in a private room) can be felt as natural and realistic as in the offline world.

Third, while social VR has been perceived as generally beneficial for initiating and building new relationships among online strangers [2,16,18,33,54], our findings reveal that it helps people to sustain existing relationships in nuanced ways. In our study, people reported successful examples of leveraging social VR to maintain almost all types of existing interpersonal relationships over distance, such as family relationships (e.g., with parents, children, and siblings), friendships, and romantic relationships. Our findings also highlight people’s different approaches when using social VR for maintaining existing close ties versus building new connections with online strangers. For example, people who aim at using social VR to maintain their existing close ties often have a clearly defined plan on what they would do together in social VR for that purpose (e.g., scheduling a movie watch activity or planning a birthday party in social VR). In contrast, people who aim at using social VR to build new connections often tend to explore the VR space spontaneously (e.g., randomly visiting certain virtual places to meet new people).

Similarly, to maintain existing relationships, people often focus on recalling/recreating familiar moments in VR that resemble what they already did in the offline world before, rather than exploring new experiences with strangers to build relationships from zero. In addition, rather than going to public places alone to meet people, people who endeavor to maintain existing close ties emphasize the importance of engaging in immersive bonding special events and spending time together with their existing close ties in carefully designed private virtual places (e.g., celebrating special occasions such as birthdays at private parties) in order to create new shared memories beyond geographical distance.

In summary, these findings (1) highlight the unique advantages of leveraging social VR to maintain existing close ties over distance compared to traditional computer-mediated long distance relationships; and (2) shed light on the different user preferences and behavioral patterns when using social VR for existing close ties versus for building new relationships among online strangers. Yet, our research also points out the emergent privacy dilemmas when using social VR for maintaining existing close ties. On the one hand, social VR can be leveraged to both building new connections and supporting existing offline relationships.

On the other hand, how to maintain a fine line between people's VR world and offline world becomes an emergent challenge. For example, some users prefer to keep their personal information and offline identity private when interacting with online strangers in social VR. However, their existing close ties, who are also present in social VR, may intentionally or unintentionally disclose such information and violate their privacy. Therefore, how to better protecting people's personal information and privacy when the boundary between the two worlds blur will require future research.

5.2 Designing Future Social VR Spaces to Support Existing Ties

Grounded in our findings, we identify two potential design directions to further support and innovate how interpersonal relationships can be supported and mediated through social VR. These design directions are neither complete nor exhaustive as they are the main directions emerging based on users' comments, posts, and our findings. Yet, we consider that they may benefit developers/designers who strive to design more socially supportive and family-friendly VR technology in the future.

Designing Family-Friendly Social VR Activities and Events. Our findings highlight the importance of engaging in mundane everyday activities for sustaining existing close ties. Replicating offline-world activities such as watching movies and having birthday parties in social VR allows users to experience their familiar offline-world activities and recreate shared memories virtually but in a way similar to face to face interaction. This thus significantly contributes to a sense of physical closeness and intimacy. Therefore, it would be valuable for future social VR spaces to provide more family-friendly places and offer more social activities that people can engage with their existing connections, such as private customized virtual places for dating, weddings, or celebrating birthdays and anniversaries.

The Ability to Categorize Friends for Privacy Purpose. Grounded in the privacy dilemma shown in our data, we also believe that providing users with the ability to further categorize their social VR friends will be beneficial. In doing so, social VR users can have more control over their availability status - e.g., shown as family time, friend time, fun time, and so forth. For example, if a user set their status as family time, only their friends in the family category can approach and interact with them. This may help people set up a fine line between their VR world/connections and existing close ties/offline world, while both can co-exist and be supported in social VR spaces.

5.3 Limitations

Our study mainly draws on Reddit posts, leading to a potential bias toward social VR users who are also active Reddit users. Therefore, our future work will

focus on collecting a larger sample of social media data from diverse platforms to further confirm our findings. Since Reddit is an anonymous forum, it is also challenging to verify users' demographic information. We thus plan to conduct semi-structured in-depth interviews and a large-scale survey with a broader participant pool with diverse demographics to investigate people's unique strategies, challenges, and expectations for using social VR to sustain their existing relationships. In addition, while prior work has shown that older adults also engaged with online technologies [4] and social VR [2,3], in our research, we did not find any data regarding how older adults may leverage social VR to support their existing close ties (e.g., grandparent-grandchild relationships). Therefore, our future work also aims to further explore how older adults can use social VR to maintain close relationships with their friends, family, and grandchild.

6 Conclusion

Maintaining belongingness and close connections with people we care for and love is crucial for our psychological and behavioral well-beings [5,29,42]. How would emerging computing technologies affect this dynamic, especially over distance? In this paper, we have explored how social VR is innovating modern computer-mediated relationships by supporting almost all types of existing close relationships in nuanced ways, such as through building a sense of physically being together, facilitating physical contacts to recall familiar moments, and simulating offline activities to create new shared memories. Despite these novelties and benefits, our findings also point to the potential privacy risks and tensions when using social VR to support existing offline relationships - e.g., concerns regarding protecting people's personal information when the boundary between the two worlds blur. As the emerging metaverse paradigm continues to grow and innovate future social interactions, we hope that these insights will inform future research and design directions to create safer and more supportive social VR spaces for people's social needs and interpersonal connections.

Acknowledgement. This work was partially supported by the National Science Foundation award 2112878.

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