Staying in Touch with Friends, Family and Partners at a Distance through Social Activities in VR - but which Activities are Desired?

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ABSTRACT

Collaborative activities such as dancing, singing, and movement games which are based on synchronised interpersonal interaction can evoke feelings of togetherness and strengthen social bonds. Doing such activities with distributed participants continues to be difficult, even in Virtual Reality (VR). Latency effects in VR disrupt the experience of synchronous movement, which may result in a reduced user experience. Instead of togetherness, people feel disjointed and 'out of synch'. As part of a larger project that aims to improve experienced behavioral synchronization in VR, we plan to develop new interaction designs for synchronous activities in VR, so that people can dance, make music and play together over long distances. Open questions concern what kind of activities people would consider as beneficial to engage with, in what situations, and with whom. We report on our first set of interviews investigating these questions, which provided first insights on user perspectives regarding desires about potential interactions and requirements for social VR activities.

CCS CONCEPTS

• **Human-centered computing → Collaborative and social computing**.

KEYWORDS

Social Virtual Reality, Entrainment, Proximity over distance, Synchrony

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1 INTRODUCTION

Often, groups of friends live all over Germany, couples are in long-distance relationships, or grandparents live far away from their grandchildren. While one can meet in video conferences, this primarily lends itself to talking, but results in shared experiences only to a limited extent. Social VR enables diverse opportunities to meet with people located at different locations around the world (e.g Germany, India, United Kingdom, etc.) in a virtual space, to see each other in the form of avatars, and to communicate verbally with each other [8]. Social VR also enables users to engage in shared activities, and thus is closer to real-life encounters, where groups of friends may play games together, or grandparents play with their grandchildren, spending time together while having fun. It is especially synchronized behaviour that evokes feelings of being 'in synch', supporting experienced intimacy.

Examples of such synchronized movement include dancing together, singing, and movement-based games, such as clapping games played by children. Even activities where there is no given rhythm often become rhythmic, for instance when people begin to walk in synch, or playing cards are dealt in a rhythmic way during a game of cards. Such rhythmic movement on the one hand shows that people have become 'entrained', and on the other hand supports feelings of 'being in synch', increasing sympathy. While Social VR offers the possibility of full-body interaction, and enables joint activities (games, joint visits to 3D environments), current VR environments and applications do not adequately support collaborative activities that rely on temporal synchronization.

The project GROOVE focuses on such body-based rhythmic activities in social VR, with families, couples, and circles of friends that are living in different places as target groups. One of the goals is to develop interaction designs for rhythmic, body-based activities, such as joint play or dance, where the interactive environment supports synchrony or may even simply create an illusion of synchrony. As a first step, we aim to find out what kind of activities the mentioned three user groups (families, couples, circles of friends) would be interested in, and what factors influence people's acceptance for such social VR activities.

2 BACKGROUND

Relationships with family, friends and partners have a decisive influence on our health and well-being. Especially feelings of closeness and connectedness are factors for a longer life, better health and increased well-being [6, 7, 9, 13]. However, decreasing interactions due to physical distance can negatively affect these aspects.

The effect of falling into the same rhythm after a certain amount of time while interacting with another person has been extensively investigated and verified - entrainment. This process usually results unconsciously to movements being coordinated with each other and "settling in" [1]. This can induce further synchronization of the movements. Hove et. al. [5] reported that synchronized behaviour supports the development and maintenance of feelings of intimacy and closeness. Launay et. al. [11] demonstrated a connection between synchronization and sympathy for the other person.

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Furthermore, Kinsbourne observed a correlation between sympathy and behavioral adaptations (i.e. one begins to mirror a person that one feels sympathy for) and divides the latter into two categories: indirect adaptations such as synchronised behaviour and direct responses, involving posture, gestures, and spoken language [10]. This perspective extends the concept of 'social' entrainment by connecting it to the expansion of body synchronization within the realm of interpersonal communication mechanisms [12].

Rinott and Tractinski [14] have already investigated the relationship between design and synchronization of motor behaviors between individuals. They examined how design decisions influence interpersonal motor synchronization, which is a crucial aspect of human interaction. Furthermore, this work contributes insights into the design principles and considerations that can affect how people move and interact with each other, and provides practical applications for fields associated with human-computer interaction and design [14]. These insights will be taken into account in further design developments.

Furthermore, cultural background influences the interpersonal interaction of people, especially between close ones like family or friends. This includes preferred forms of communication (e.g. direct vs. indirect) [3] and thus can additionally influence the perception of interaction. Therefore, also cultural aspects should be considered in future design decisions.

3 FIRST STEPS

For the requirements analysis, user groups were defined (groups of friends, romantic couples, families living apart, e.g. grandparents and grandchildren) and potential participants in Weimar and the surrounding area were identified. For initial interviews, recruitment has already started, first focusing on friends and partners who live at a distance. Given international students tend to fit with several of our categories (having friends, family, and often also romantic partners at a distance), we recruited international members of our university for our first set of interviews. In addition, international students might offer different perspectives on interaction with close ones due to their cultural background, as described above. The group of participants will be extended to other user groups in the next step, especially with regards to older age groups. To identify first impressions, requirements and future user scenarios, semi-structured interviews were conducted before and after a demo session, where participants chose two out of four pre-selected VR games to try out.

The VR games were carefully selected in advance from existing multiplayer games, focusing on showcasing body-based games or activities, and presenting different game types. As one example, "Beat Saber" was chosen, a music game where boxes have to be destroyed to the beat of the music. The second game is "Eleven Table Tennis", a realistic table tennis game that allows two players to compete against each other. In addition, the game "Mash Me Up" was chosen, which allows to try out various mini-games, such as air hockey, snowball fight or beer pong. The last game selected was "Hand Physics Lab"; while this is the only game without a multiplayer mode, it features hand-tracking control and thus demonstrates further possibilities in VR. In this game, child-friendly puzzles are solved, such as marble mazes or the coloring of eggs. To ensure the interview sessions remained within a reasonable length, and still provide a good overview, participants could play two games, while the other two games were subsequently shown as demo videos.

Through the interviews, in addition to demographic questions, the respective distance relationship and current in-person and mediated interactions are investigated. Furthermore, we sought feedback on the project idea, and asked for participants' ideas for potential interaction scenarios (types of activities and games) and requirements for increasing attractiveness and accessibility of such a solution.

4 INITIAL INSIGHTS & DISCUSSION

So far, interviews have been conducted with 12 participants (7 male, 5 female), all in their 20s and recruited from the university context. Everyone described themselves as quite tech-savvy (7 on a scale of 1-10). Participants indicated hat they could imagine playing such a game with friends and with family, who are on average much older (in their 60s) and less tech-savvy (3 on a scale of 1 -10).

First insights from the interviews reveal that most of the participants (most are international students) desire more contact with their relatives and friends. A contact over digital media takes place almost every day, but meeting in person is usually only possible once a year. The distance makes it difficult to stay in touch and participants even stated: "I feel like I'm loosing a friend because we can't do activities together" (P5). This highlights the relevance of our project idea.

Regarding what happens during in-person interactions, the interviews so far show that activities with little body movement are usually favored, especially for interacting parties (young adults-parents / young adults-grandparents) with a larger age difference. The focus tends to be more on "enjoying the moment" instead of extensive activities. Therefore, in this regard the most frequently performed interactions were "cooking together", "watching movies" or "going for a walk". This may also be related to movement restrictions in older age, or to age-related differences in interests previously mentioned during current interactions. For interacting with people at a similar age (compared to the students interviewed), more sportive activities, such as table tennis, hiking or dancing were mentioned. Moreover, participants were only able to mention very few cases of interactions where they felt particular close. This concerned especially time-intensive meetings where deep conversation or physical touch contributed to increased feelings of closeness, e.g. "playing horse with nephew" (cf. P1).

The current (remote) interactions are limited to (video) phone calls or messaging via cell phone. In this regard, the limited opportunities for interaction and the comparative lack of personality are criticized: "the connection don't really satisfy you" (P1), "the personal is missing" (P4), "frustrated that he cannot properly express himself just over the phone" (P5). Nevertheless, many participants stated that cell phone conversation were sufficient so far. However, this might be due to them being used to these restricted interaction possibilities, respectively the fact that there are barely any other options.

So far, participants were all enthusiastic about our project idea: "great, the games strengthen the feelings/ emotions which you normally just have while doing stuff in person" (P8), "love it,through

synchronisation/ doing stuff in time one can relate better" (P9). Compared to the media currently used, such an approach would strengthen the bond between people living far away (cf. P1) and increase the feeling of still being part of each other's lives (cf. P9). Nevertheless, the participants criticize the (expected) complex setup process for such technology, which would make spontaneous use impossible, as well as the requirement of a large space for interaction in order to be able to participate in VR interactions: "without a proper setting one could be worried to run into something while wearing the HMD" (P3). The need for a strong internet connection, which is rarely given, was also highlighted.

Initially, the interviewees could primarily imagine using such social VR activities with friends and partners. Parents and grandparents were only considered as potential players after participants had experienced the demos, in the post-interview, whereas they were never mentioned for same questions in the first interview. The demonstration were the first time participants considered anyone they knew as a possible playing partner. As before, this might relate to possible movement restrictions or different interests, which appeared to change after experiencing a demonstration of the interaction possibilities in VR. The interviews indicate that the user group involved so far (international students that want to keep in touch with family and friends) would have the intention to regularly use these social VR activities (once a week). However, this interaction still would need to be scheduled in advance. For fast contact initiation, smartphone contact would still be preferred .

On the one hand, real-life interactions are desired, such as sports activities (rowing, table tennis, workouts, etc.), as well as music or rhythm games like dancing or artistic possibilities such as painting. On the other hand, the request to experience activities that are different from reality was often expressed: "Make things that are not accessible in real-life instead of copying games that are already there in real-life, think outside of the box, seize opportunities of VR, e.g. exploring the inside of a human body" (P2). However, participants would suggest slower games and games with little movement for older people and accordingly "more activities where you enjoy the moment". When asked for suggestions for social VR activities for very young people, games were recommended that support their development, e.g. math games or interactions to improve motor skills.

However, many other requirements need to be fulfilled to really achieve successful use of the application. These include, for example, the need for an audio connection, customizable avatars for realistic appearance (e.g. inserting a picture of your own face). This would lead to an experience perceived as more realistic (cf. P3), as well as improvement of body movements regarding more precise tracking (cf. P8). Another issue still is accessibility of VR, with many issues highlighted in the literature, such as the size and weight of HMDs (too large for small heads), HMD adaption to different hair styles or the wearing of glasses, simulation sickness, or the compatibility of VR interactions with mobility aids or physical impairments [2, 4].

Since the targeted use scenarios also include interaction of grandparents and grandchildren, further requirements have to be considered for VR interactions. Particular focus should be placed on a simple setup with clear and simple instructions (simple words, bigger text, easy interface) (cf. P2). Furthermore, it should be possible to customise the extent of required movements, enabling less actual movement for a comparable movement in VR (movement length / intensity settings), or entirely different movements (to compensate for physical impairments or differences in strength and endurance). This includes speed settings that can compensate for different reaction times. In addition, impaired eyesight and hearing should be taken into account (cf. [2, 4]).

Further interviews are to provide a deeper insight into the perspective of further user groups and deliver results regarding the requirements analysis as a basis for future development.

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REFERENCES

[1] Martin Clayton, Rebecca D. Sager, and Udo Will. 2005. In Time With the Music: The Concept of Entrainment and Its Significance for Ethnomusicology. *European Meetings in Ethnomusicology* 11 (2005), 3–142.

[2] Chris Creed, Maadh Al-Kalbani, Arthur Theil, Sayan Sarcar, and Ian Williams. 2023. Inclusive AR/VR: accessibility barriers for immersive technologies. *Universal Access in the Information Society* (feb 2023). https://doi.org/10.1007/s10209-023-00969-0

[3] Ge Fiona, Park Jiyoung, and Pietromonaco Paula R. 2022. How You Talk About It Matters: Cultural Variation in Communication Directness in Romantic Relationships. *Journal of Cross-Cultural Psychology* 53(6) (2022), 583–602. https://doi.org/10.1177/00220221221088934

[4] Fiona Heilemann, Gottfried Zimmermann, and Patrick Münster. 2021. Accessibility Guidelines for VR Games - A Comparison and Synthesis of a Comprehensive Set. *Frontiers in Virtual Reality* 2 (2021). https://doi.org/10.3389/frvir.2021.697504

[5] Michael J. Hove and Jane L. Risen. 2009. It's all in the timing: Interpersonal synchrony increases affiliation. *Social cognition* 27, 6 (2009), 949–960.

[6] House James S., Landis Karl R., and Uberson Debra. 1988. Social relationships and health. *Science* 241(4865) (1988), 540–545. https://doi.org/10.1126/science.3399889

[7] Martino Jessica, Pegg Jennifer, and Pegg Frate Elizabeth. 2015. The connection prescription: using the power of social interactions and the deep desire for connectedness to empower health and wellness. *Am J Lifestyle Med* 11(6)) (2015), 466–475. https://doi.org/10.1177/1559827615608788

[8] Corinne Jola and Matthew Reason. 2016. Audiences' experience of proximity and co-presence in live dance performance. In *Theatre and cognitive neuroscience*. Bloomsbury Publishing, 75–92.

[9] Lem Kaitlyn, McGilton Katherine S., Aelick Katelynn, and Iaboni Andrea. 2021. Social connection and physical health outcomes among long-term care home residents: a scoping review. *BMC Geriatrics* 21(1) (2021), 722. https://doi.org/10.1186/s12877-021-02638-4

[10] Marcel Kinsbourne and Molly Helt. 2011. Social entrainment of typically developing and autistic children. *The neuropsychology of autism* (2011), 339–365.

[11] Jacques Launay, Roger T. Dean, and Freya Bailes. 2014. Synchronising movements with the sounds of a virtual partner enhances partner likeability. *Cognitive Processing* 15 (2014), 491–501.

[12] Joseph E. McGrath and Janice R. Kelley. 1986. *Time and human interaction: Toward a social psychology of time.* Guilford Press.

[13] Engineering National Academies of Sciences and Medicine. 2020. *Social Isolation and Loneliness in Older Adults: Opportunities for the Health Care System.* The National Academies Press.

[14] Michal Rinott and Noam Tractinski. 2022. Designing for interpersonal motor synchronization. *Human Computer Interaction* 37(1) (2022), 69–116.