

Exploration of VR Game Behaviors During Role-Playing for Fear of Intimacy Assessment

#HCI #Virtual Reality #Game #Health

Virtual Diagnostic Evaluating Game Behaviors



1. PROJECT

We developed a VR game as a behavioral assessment tool to simulate an intimate environment diagnosing the disorder of fear of intimacy. No specific tasks are offered to participants to complete, but their within-game behavioral response towards certain interactions, such as their willingness to get closer to the virtual partner, are monitored. Our design aims to explore the possibility of using VR to simulate a natural environment to assess the fear level that patients have in a real intimate scenario as a complement to clinical assessment tools.

My Role

Project Manager, Game Designer, UX/UI Design, Researcher

Duration

12 Weeks - with 3 Student Researchers

2. PROBLEM

Fear of intimacy causes loss of human connections and sabotages relationships, affecting over 2.5% of the population, yet its diagnosis is difficult due to the need for clinicians to get close to the subject emotionally before making valid individualized assessments. These difficulties are particularly daunting in prolonged isolation, due the worsening of anxiety and unavailability of clinicians. To design more comprehensive and feasible strategies for assessing fear of intimacy, we turned to a Virtual Reality (VR) paradigm using role-play scenarios to evaluate the in-game behavior of subjects, including decisions-making, distance-to-a-character, and biometric data. Our design aims to explore the possibility of using VR to simulate a natural environment to assess the fear level that patients have in a real intimate scenario as a complement to clinical assessment tools.

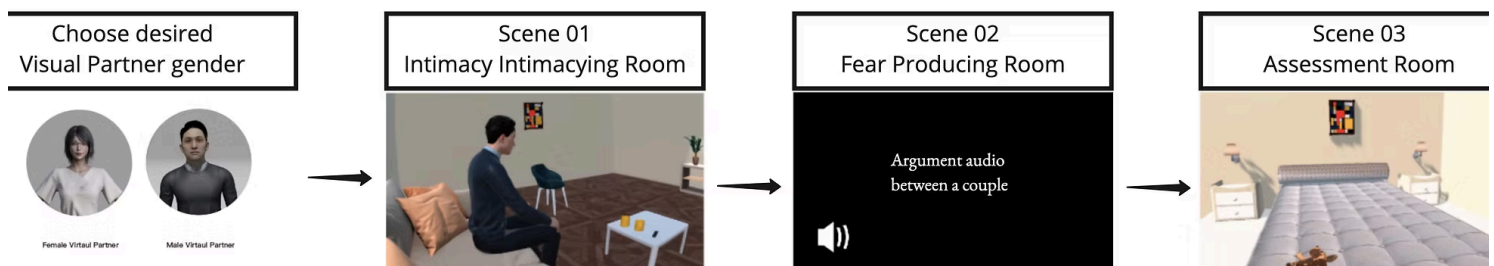
Our study was guided by the follow research questions:

- RQ1. Do participants' behavioral choices, actions in play, physiological indicators, and verbal responses in each VR environment can reflect their level of intimacy fear?
- RQ2. How can specific scenarios in VR capture and reflect the participants' fear of intimacy during play?

3.GAME DESIGN

Fear of intimacy causes loss of human connections and sabotages relationships, affecting over 2.5% of the population, yet its diagnosis is difficult due to the need for clinicians to get close to the subject emotionally before making valid individualized assessments. These difficulties are particularly daunting in prolonged isolation, due the worsening of anxiety and unavailability of clinicians. To design more comprehensive and feasible strategies for assessing fear of intimacy, we turned to a Virtual Reality (VR) paradigm using role-play scenarios to evaluate the in-game behavior of subjects, including decisions-making, distance-to-a-character, and biometric data.

3-1. Game Process



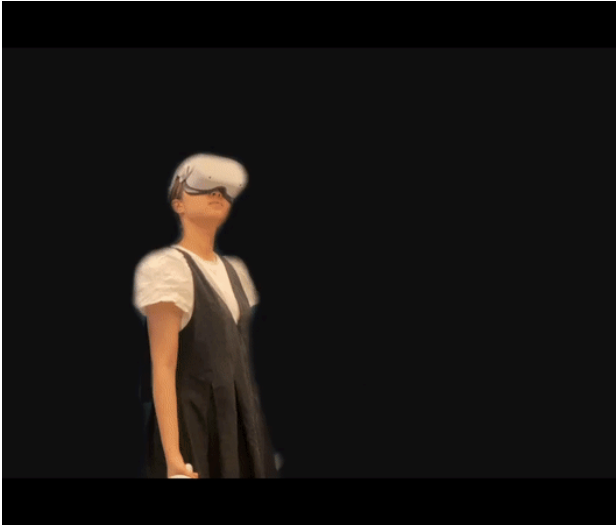
3-2. Game Environment & Player Tasks



SCENE 1 INTIMACY INITIATING ROOM

(1) Player will be placed in a real sized living room with the visual partner.

(2) Players were asked to choose their feeling of psychological distance between them and partner.



SCENE 2 ARGUMENT AUDIO

(1) Audio Content

Actor 01: "Why you always do like this to me? You could not understand me at all! "

Actor 02: "What do you mean I always do this to you?"

...

(Door-heavily-close sound)

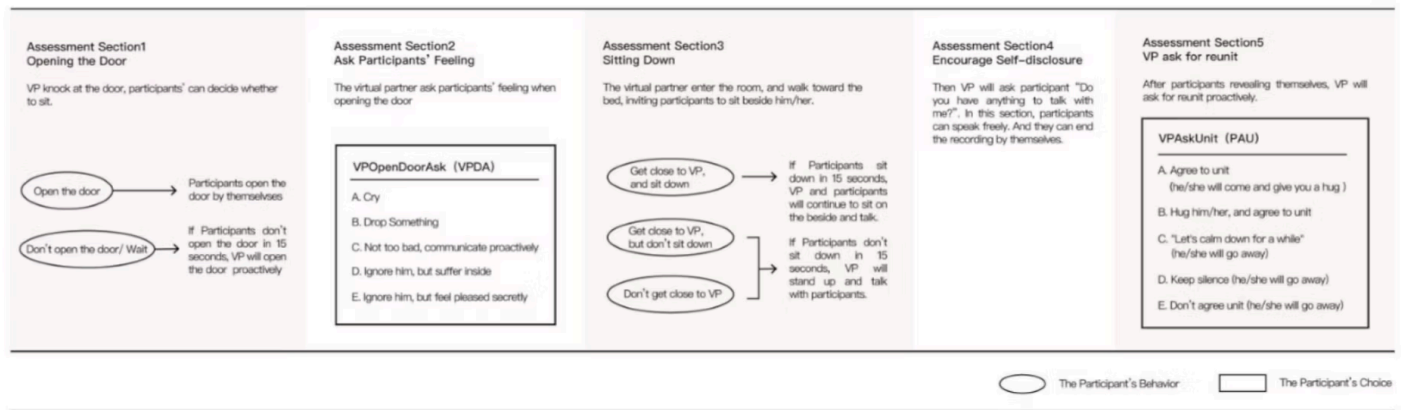
(2) Players were asked to choose their feeling after hearing the argument audio.



SCENE 3 FEAR ASSESSMENT ROOM

(1) The player would be placed in a real-world size bed room environment.

(2) Players were asked to response and interact with virtual partner(VP) by choosi their behaviors, such as opening door or sitting near VP.



The sequence of assessment sections in scene03. VPDA - the choice after seeing the virtual partner open the door, representing the participant's level of avoidance of the virtual partner's active approach behavior. PUA, the choice after virtual partner seek makeup, representing the participant's level of avoidance of the virtual partner's active approach behavior.

3-3. Game Environment

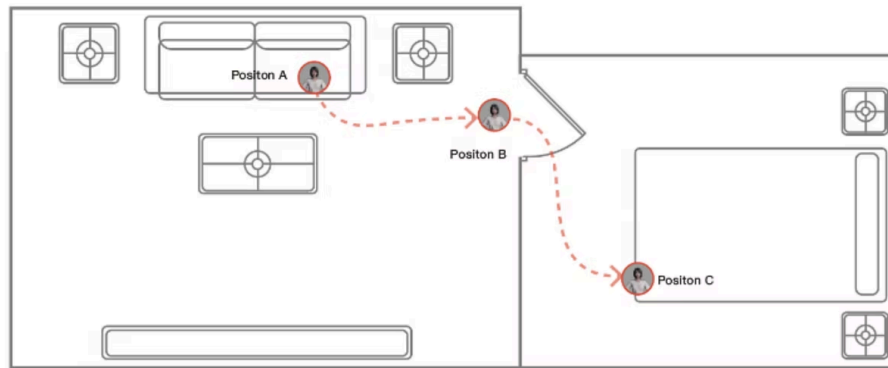


Figure 1: Game environment floor plan, which shows the virtual partner's movements from Position A in living room(Figure 2) to Position C in bed room(Figure 3).



Figure 2: A real-world size living room, including interactable items(mugs and remote controller,) player can pick them up just like how they do in the real world.

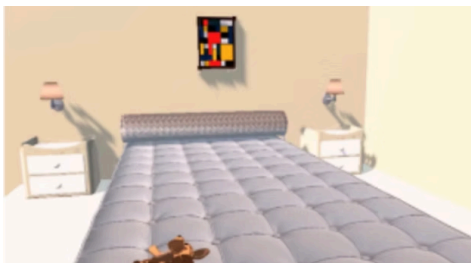


Figure 3: A real-world size bed room decoding with poster and paintings on the wall. No grabbable items in this room, but players can click bed to sit on the bed.

4.TESTING

In our testing section, we had two testing goals that we wanted to achieve. (1) Examining our hypotheses in this study, which are listed 2.Problem Section. (2) Testing the VR game quality from user experience perspective. For goal one, I will just briefly describe our findings here. We describe all details in our paper that submitted to CHI2022, and the link is in the end of this page. For goal two, We interviewed 4 participants and collected 38 participant's(F=26, M=12) Presence Questionnaire Feedback.

4.1 Experienment Results

Our evaluation method involved the participants doing the FIS assessment before experiment then comparing participants' behavioral avoidance choices within the game to see if there was a correlation between the different avoidance choices and the FIS.

(1) We found significant differences in the responses of participants in specific fear groups, demonstrating the ability to predict levels of avoidance tendencies based on game behavior. We found that the maximum and minimum distances to the virtual partner were unrelated to FIS and other anxiety measures, one of the reasons might be our virtual environment is in a small room where does not have much place for participants to move around. The gap between maximum and minimum is not that significant detectable.

(2) In the results of the data divided into subgroups according to gender (Female and Male), we found that there was a significant difference in the fear scores of males choosing different options when the virtual partner asked for making up. However, whether asking for a compatible interaction scenario can really assess men's intimacy fear level needs to be further studied.

(3) The results of our female participants' choice of psychological distance in intimate settings, sitting with virtual partner, could reflect their anxiety differences. In particular, the difference between female participants who felt they were generally intimate and very intimate was significant.

4.2 VR User Experience Testing

After 39 participants experienced this VR game, they were requested to evaluate their overall experience in this VR game. We used Presence Questionnaire(PQ), which adopted by Valentin Schwind, to examine the quality of our virtual reality environment. This questionnaire includes a four-factors model, includes Involvement, Adaptation/Immersion, Sensory Fidelity, and Interface Quality. We have table below presenting the detail score we got from the PQ.

	PQ	Involvement	SensoryFidelity	AdaptationImmersion	InterfaceQuality
M	4.78	4.87	5.04	4.88	3.61
SD	0.66	0.84	0.85	0.77	0.82

The total score is 4.78 out of 7. Overall, VR scenes we built are realistic, appropriately scaled, immersive, essentially free of dizziness, and the options that participants make basically reflect their true thoughts. We analyze some factors that enhance immersion and some that reduce it from a design and user experience perspective. Based on the interviews with participants, we summarized some take-away points below that might offer some insights of creating a better VR assessment experiences in future applications:

1. Factors that **enhance** the sense of immersion

(1) Appropriate scale of space and figures

Some participants mentioned that they considered that objects and characters we built in the VR environment are very close to the state we see in our lives because the scale between objects in the VR environment and participants themselves is very harmonious, just feel like we are really standing in a room about the same size as the reality.

(2) Physical interactions in VR

Participants in our VR environment can interact physically, trying to do anything they want to do instinctively. Many participants think that they feel good to opening the door by themselves. Because they can open the door by reaching the handle instead of through the mouse and keyboard, which enhances the sense of immersive in the test.

(3) Low Motion Sickness in VR

VR health-related issues are reported including, but not limited to nauseated feeling, vomiting, dizziness and cold sweats. These issues introduce a well-known side effect termed as motion sickness in VR users. In our test, some participants think that they don't feel any uncomfortable, one participant had strong motion sickness when he experienced VR last year, but for this time, the motion sickness is quite mild and only a little when becoming the end of the test.

2. Factors that **reduce** the sense of immersion

(1) The character model is not realistic enough

When we did virtual partners' animation, we only built the animation of their body. Virtual partners can only express their emotions through their body language, without facial expressions. Some participants feel that virtual partners do not look like a real person very much. The virtual partner's voice is okay, but still feel a little difficult when detecting virtual partners' feeling expression. And some participants think that the movements of virtual partners

are a little stiffness. Not realistic enough character models may reduce participants sense of immersive in VR.

(2) Personality difference between participant's and role's

We design a quarrel scene to motivate participants' fear of intimacy. However, some participants said they did not feel immersive in this part because they have not been in a fight with anyone.

5. REFLECTION & FUTURE WORK

Our game only simulated environments that present a romantic relationship, and it may exclude the assessment of people who do not have such intimate experiences. Within the game, only emotional intimacy can be assessed, but in fact, fearing of physical intimate behavior, which are included in the FIS questionnaire. It is a challenge to stimulate a physically intimate environment in a pleasurable way that will not trigger people's trauma or ethical issues. The future work can explore the suggestibility of game elements to measure fear of intimate physical contact. A take away is that our in-game and behavior data shows our game has its potential to probe the fear intimacy without needing to establish rapport and this might let us bypass establishing rapport with some groups who are uncomfortable to communicate and self-disclose to stranger(clinicians). It is worth to mention that the individuals in our sample are in a high range of FIS and anxiety level, so the differences between individuals with low levels of intimacy levels

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behaviors may be able to distinguish between high and low FIS values if these lower FIS scores for non-anxious individuals are better represented. We may have more findings when we conduct and compare in-game behavioral differences between two more distinguished groups in the level of fear of intimacy in the future.

Publications

Yijun Qian, Luoying Lin, Zhimeng Zhang, Xin Tong, and Ray LC. 2021. *Virtual Diagnostic: Using Game Behavior During Immersive Role-Playing for Clinical Assessment of Fear of Intimacy*. CHI2022 New Orlean, LA, USA.

[Check pdf.](#)