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Effect of Observing a Virtual Double on Paranoia in Social Virtual Environments: Experiment Preliminary Presentation

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ABSTRACT

We present an experiment designed to investigate whether seeing a virtual double performing an action in a social context can impact participants' psychological state. With the help of a 3D scanning process, we are interested in exposing participants suffering from moderate paranoid thinking to a ubiquitous social situation where they see their virtual double carry out a social interaction task, in order to observe if this can reduce anxiety and paranoia levels prior to carrying out the task themselves.

1 INTRODUCTION AND BACKGROUND

It has been demonstrated that immersive virtual environments (IVE) allow the simulation of situations eliciting paranoid thoughts and unfounded fears in the general population [4]. Moreover, embodiment of virtual avatars has been shown to impact behavior and other socio-cognitive processes [2]. It has been demonstrated that controlling a virtual double can affect the sense of embodiment and lead to behavioral adaptations [5]. Furthermore, observing an autonomous virtual double performing activities (e.g. sport, public speaking) can lead to behavioral modifications with persistent effects on participants' real lives [1, 3]. Therefore, based on previous research on paranoia and embodiment in immersive virtual environments, we argue that it may be possible to reduce paranoid thoughts in people in social tasks. Specifically, showing their virtual double carrying out a social interaction task before they do so themselves, it may be possible to reduce their anxiety with persistent effects on their real life after exposure.

2 MATERIAL AND METHODS

Participants will be scanned to create a 3D model allowing them to embody their virtual double. During the second session, they will be equipped with the virtual reality devices (HTC Vive Head Mounted Display and Vive trackers) to be immersed in the virtual environment and to control their virtual body in real-time. Participants will observe members of a virtual crowd talking to one another in small groups (Figure 1) after an initial period of acclimatization to the environment and their virtual body. Their task consists of finding to which of these small groups they belong by approaching and asking each group "Am I in your group?". Once the correct group has been found, they will be invited to listen to the conversation and later report back on what they were talking about. Before they perform the task, a transparent virtual double will emerge from their position and they will observe it carrying out a similar task to the one they had been asked to do. Depending on the experimental condition to which participants will be randomly assigned, the virtual double behaves in two different ways:

Figure 1: Agent clusters in the virtual environment.

- **Random Behavior:** the virtual double walks randomly avoiding the groups of virtual characters.
- **Targeted Behavior:** the virtual double walks toward the groups of virtual characters and interacts with them.

After observing their virtual double in the environment, participants will have to find and interact with their found group and to repeat this task three times. The discussion topic will be different each time. Participants will be asked to subjectively report their level of anxiety several times during the experiment. Finally, they will answer a post-experiment questionnaire about social paranoia in virtual reality. We expect that seeing a virtual double carrying out a social interaction task in advance will reduce both anxiety and paranoia levels. Finally, participants will come one week after for the third session of the experiment to complete the same questionnaire used for the recruitment process to assess their paranoia level after all the exposures. Thus, we will be able to compare this paranoia level with their pre-experiment one to observe if the experiment induces some persistent post-exposure effects.

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