5. USING VIRTUAL REALITY WITH INDIVIDUALS WITH MENTAL DISORDERS

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5.1. INTRODUCTION

"Virtual reality" (VR) describes an "interactive computer environment": "A computer generated an image; a display system presented the sensory information; and a tracker fed back the user's position or orientation in order to update the image. The elements combined to substitute sense data from the natural world with sense data about an imaginary world that changed in response to the user's actions" (Freeman 2008 p605).

5.2. USES OF VR

Studies have started to appear in recent years using VR with individuals with mental disorders. VR can be used in a number of ways with this group of people and in this area of psychology and psychiatry (Freeman 2008).

1. Symptom assessment

Usually symptom assessment is based upon an interview between a psychiatrist, for example, and the patient, or a self-reported questionnaire completed by the patient. Both of these methods have weaknesses like the honesty or lack of insight in replies to questions.

VR can be used by presenting a neutral social situation and observing how the person responds. The avatars (characters in the VR environment) will be programmed to act in a neutral way.

For example, Freeman et al (2008) have developed a virtual London Underground train ride to assess persecutory/paranoid thoughts. Two hundred participants from the general population used the five-minute virtual journey on a train populated by avatars of different people behaving in different ways. Individuals were asked afterwards to comment on the experience.

A neutral comment about the "people" on the train was, for example, "Didn't think anyone thought anything about me. All getting on with own business. Nobody seemed to notice me". Positive comments included, "One guy was checking me out - flattering", while negative was, "Thought a couple of the men were stuck up and nasty.

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Lady sitting down laughed at me when I walked past" (Freeman 2008 p607).

2. Establishing symptom correlates

Physiological measures can be taken during the VR experience. For example, eye tracking can monitor what the individual is looking at in a particular VR social situation, and heart rate can be measured in response to a virtual precipice. These measures can be related to symptom occurrence.

3. Identification of predictive variables

Individuals fill in a series of tests beforehand and then their behaviour in a VR social situation is assessed. This allows the identification of differences in behaviour based on test scores. For example, Freeman (2007) found that paranoid thoughts in VR were linked to pre-VR higher scores of anxiety and cognitive inflexibility.

4. Identification of differential predictors

VR can also be used to show the differential symptoms between mental disorders. For example, anxiety, worry and depression were associated with both social anxiety and paranoid thoughts in VR, but only perceptual anomalies (as measured beforehand) was associated with paranoid reactions in VR (Freeman et al 2005).

5. Identifying environmental predictors

The VR can be altered to assess the environmental factors involved in mental disorders. This is a great strength of VR, and is something that cannot be done very easily in real-life. Factors include the size of the room, number and distance of other people, eye contact and facial expressions of others, and amount of background noise (Freeman 2008).

For example, Pertaub et al (2002) varied the response of an eight-avatar audience to the participant giving a public speech from signs of interest to those of boredom.

6. Establishing causal factors

Building on the previous point, experiments can be

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designed with various VR conditions to test the effects. It allows the manipulation of variables and control of an experiment, as well as the choice of independent or related designs. For example, an individual with psychosis can take the virtual London Underground train ride with and without medication. There are no risks as there might be in such a real-life event.

7. Developing treatment

This is the area where VR has developed most and probably will do so in the future. VR environments can be created for individuals with particular fears and phobias; in some cases, that are not possible in real-life.

Studies are showing the usefulness of VR compared to traditional methods of therapy. In one study, Emmelkamp et al (2002) used exposure to heights in VR with individuals with that fear (acrophobia). Even though the participants knew the VR heights were not real, they still showed anxiety responses. Three sessions with VR were found to be as effective in reducing fear of heights as in-vivo (real-life) exposure.

While Rothbaum et al (2000) used VR in anxiety management training of fear of flying (FOF). It was as effective after six months as standard exposure therapy.

They described their VR apparatus:

> The computer system used in the current study consisted of a 300 MHz Pentium II processor with 128MB memory, a SCSI disk drive, and a Fire GL 1000 video card. A Virtual Research VR6 (Virtual Research Systems, Santa Clara, CA) head-mounted display with stereo earphones transmitted the VR image to the participant. The participant was seated in a Thunderseat ® (Thunderseat, Los Angeles, CA), a specially designed seat with an embedded 100-watt subwoofer and an attached airplane seatbelt. The virtual airplane software for FOF was created by Virtually Better, Inc. (Atlanta, GA; www.virtuallybetter.com). VR-generated scenes placed participants in a passenger seat by the window on a commercial airplane. As they moved their heads to the left, they were able to see out the left-hand window. As they moved their heads to the right, the empty seats to the right side of the airplane and the right side window came into view (p1021).

Overall there are a number of strengths and weaknesses of using VR with individuals with mental disorders (table 5.1).

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STRENGTHS

1. Overcome problems of traditional symptom assessment like interaction variables in interviews.

2. A neutral social situation can be created.

3. VR can be combined with physiological measures to assess how the person is responding to the VR scenario.

4. It is possible to change the environment within VR to assess environmental triggers to behaviour. Allows for the manipulation and control of variables in experiments.

5. Can create environments in VR that are not possible in real-life, for example, in relation to fears and phobias.

6. Experiments using VR technology will become more acceptable as VR is more common in everyday life (eg: "virtual bank cashier").

WEAKNESSES

1. Requires individuals to take the VR environment seriously and "believe" that it is like a real situation. Despite technological development, virtual humans are 2-D images and not real people.

2. Side effects of "simulator sickness" including dizziness, nausea, headache and eyestrain, as well as the risk with individuals prone to seizures when watching television (Freeman 2008).

3. it is expensive and difficult to carry out VR experiments requiring complex equipment in a VR laboratory.

4. The ethics of making the VR environment unpleasant, aversive or challenging for the individual.

5. Still need to ask participants about their experiences in VR which limits the use with non or low verbal individuals.

6. Some studies still dependent upon paper-and-pencil tests in order to find associations with behaviour in the VR.

Table 5.1 - Strengths and weaknesses of using VR with individuals with mental disorders.

5.3. REFERENCES

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