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psychological evaluation instruments in which ten acknowledged Mexican experts participated. It also discusses the adjustments made to the evaluation instruments derived from this process.

Cybersickness and Postural Instability in a Virtual Moving Room

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Historically motion sickness has been most widely associated with physical motion environments, as found in cars and on ships, trains and aircraft. However, motion sickness is not restricted to physical motion, but is also reported in virtual domains such as vehicle simulators, head-mounted displays and video games. The negative impact of cybersickness on the utility of virtual environments motivates an understanding of the malady. It is essential to assess cybersickness at a situational level. Is there a unitary cause across a multitude of situations or multiple causes that are situation-specific? The ability to predict an individual's susceptibility may lead to changes in the development of virtual technology. We have provided evidence that instability in the control of bodily orientation is sufficient for the occurrence of cybersickness. This effect has been observed with several sources of visual motion (e.g., moving room, flight simulator, video games), which support the notion of a unitary causal link between prior changes in postural activity and cybersickness. To date, there has been no direct comparison of a virtual environment with its corresponding real environment in the context of postural instability and motion sickness. We hypothesized that motion sickness and postural instability elicited by large-field visual oscillations of a physical environment (e.g., a moving room) would extend to the visual oscillation of virtual environment presented via a video projector system. Standing participants were exposed to a computer-generated simulation of a moving room for up to 40 minutes and were instructed to discontinue the experiment if they experienced any symptoms of motion sickness. Sickness incidence was assessed by the subjects' yes/no statements, and severity was evaluated using the Simulator Sickness Questionnaire (SSQ). Postural activity was assessed by recording movements of the head and torso using a magnetic tracking system. Forty-two percent of subjects reported motion sickness, which is comparable to the incidence found in physical moving rooms. Post-test SSQ scores were higher for the sick group, but not for the well group. Motion sickness was preceded by changes in postural motion among those who became sick, relative to those who remained well. Some differences between sick and well evolved over time during exposure to the virtual moving room. This finding contrasted with studies in a physical moving room, in which all differences in postural activity between sick and well subjects were stable over time. The results indicate (1) that motion sickness occurs in both physical and virtual moving rooms, (2) that in both cases motion sickness is preceded by changes in postural activity, and (3) that physical and virtual moving rooms nevertheless differ, in terms of the development of postural instability among those subjects who eventually become motion sick. We conclude that tracking of postural activity may permit online prediction of motion sickness susceptibility in individuals, and that there may be subtle behavioral differences in responses to virtual and real environments.

Development of Simulated Auditory Hallucination Exposure Environments: A Pilot Study

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Schizophrenia is a brain disease that affects general cognitive function causing problems such as delusion, hallucination, thought disorder, blunted expression of emotions, social withdrawal, and awareness of confusion. Auditory hallucination, among symptoms of schizophrenia, designates the phenomenon that someone hears or seems to hear sounds that do not exist. Patients with schizophrenia could be disturbed by the sound irrelevant to real situations such as auditory hallucinations while healthy people can ignore those sounds. Conventional therapies for treating hallucination were used with medication and cognitive behavior therapy. But in conventional cognitive behavior therapy, it is very difficult to simulate the stimulus such as auditory hallucination. In addition, there are some problems with nonobjective assessment due to dependence on the therapist's ability to assess the patient's state or training effectively. Virtual reality (VR) techniques could overcome these shortcomings. VR techniques can simulate the auditory hallucination with controlled 3D virtual environments by generating irrelevant sound stimulation. Therefore, in this study, we developed the VR system to present effective auditory hallucination stimulus and to measure the subject's response to simulated auditory hallucination. The developed VR system consisted of a PC, head-mounted display (HMD), orientation tracking sensor, and a joystick. Virtual environment tasks consisted of four situations: "errand to the grocery store," "packing for travel," "having medical treatment at hospital," and "getting an order and serving at a fast-food restaurant." Auditory hallucinations were provided during each task. Four healthy participants (3 males and 1 female) were recruited. Movement pathway (trajectory), performance time (during experience of each situation), and the number of simulated hallucinations were obtained during participant's experience of the developed virtual reality system. Moreover, the Launay-Slade Hallucination Scale (LSHS) and hallucination experience scale (asking understanding about auditory hallucination) were answered after experiences. In the results, there was positive correlation between the LSHS score and performance time and the number of simulated hallucinations. Hence, it could be explained that the participant who is more prone to auditory hallucinations is more influenced by the simulated auditory hallucinations in virtual reality. The participants show more understanding about auditory hallucinations after the experience with the virtual reality system than before that experience. It can be considered that the developed virtual reality system can provide effective auditory hallucinations and assessment of behavioral characteristics about hallucination. This is a pilot study for the development of an auditory hallucination exposure system using virtual reality. A follow-up study will be about clinical experiments with schizophrenia groups for verifying cognitive behavioral characteristics to auditory hallucinations.