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## Virtual reality in the treatment of spider phobia: a controlled study

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### Abstract

This study explored whether virtual reality (VR) exposure therapy was effective in the treatment of spider phobia. We compared a treatment condition vs. a waiting list condition in a between group design with 23 participants. Participants in the VR treatment group received an average of four one-hour exposure therapy sessions. VR exposure was effective in treating spider phobia compared to a control condition as measured with a Fear of Spiders questionnaire, a Behavioural Avoidance Test (BAT), and severity ratings made by the clinician and an independent assessor. Eighty-three percent of patients in the VR treatment group showed clinically significant improvement compared with 0% in the waiting list group, and no patients dropped out. This study shows that VR exposure can be effective in the treatment of phobias. © 2002 Elsevier Science Ltd. All rights reserved.

*Keywords:* Virtual reality; Exposure therapy; Spider phobia

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### 1. Introduction

An estimated 10–11% of the US population experiences a specific phobia at some point in their lives, (American Psychiatric Association, 1994; Magee, Eaton, Wittchen, McGonagle & Kessler, 1996). Approximately 40% of specific phobias belong to the category of “bugs (including

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spiders), mice, snakes or bats” (Chapman, 1997). Spider phobics characteristically display a persistent fear of spiders, an immediate anxiety response upon exposure to a spider, and avoidance of spiders. Phobics often recognize that their fear is excessive or unreasonable (American Psychiatric Association, 1994). In fact, for some, fear of the irrational reaction they will have when encountering a spider (losing control, panic attack) is a major source of their anxiety. Consistent with Rachman’s theory (1976, 1977) about the acquisition of phobias, Ost and Hugdahl (1981) found that the majority of phobics reported acquiring their fear via conditioning (58%). Others reported instruction (e.g. by their parents) as the source of their phobia (10%), acquired their fear vicariously (15%), or couldn’t remember (10%).

‘In vivo’ exposure therapy has been used successfully with a wide range of phobias including fear of spiders (Craske & Rowe, 1997; Marks, 1987; Ost, 1997) and is considered to be the treatment of choice for specific phobias (Antony & Swinson, 2000; Marks, 1987; Mathews, 1978). With in vivo therapy for spider phobia, patients gradually and systematically approach closer to a live spider over a period of several one-hour sessions. Some researchers have had great success treating spider phobics in an accelerated single massed three-hour in vivo exposure session, both with individuals and group sessions (see Ost, 1997 for a review). However, the experience is likely more distressing for the patients than multiple sessions distributed over a period of days, weeks or months. In general, for patients motivated enough to seek therapy for their phobia, single session in vivo exposure therapy has a high success rate (Ost, 1996), and fear reduction tends to be long term, with low relapse rates. Imagery exposure therapy, having the patient imagine situations involving spiders, can also be effective (Hecker, 1990), but is limited by the fact that some patients have trouble imagining spiders, and/or the imagined spiders do not elicit sufficient anxiety to be valuable.

Unfortunately, around 60–85% of those afflicted with specific phobias never seek treatment for their problem (Agras, Sylvester, & Oliveau, 1969; Boyd et al., 1990; Magee et al., 1996). Many phobics are probably too afraid of confronting the feared object or situation to seek therapy (Marks, 1992). Now that researchers and therapists have succeeded in developing and testing effective ways of treating phobias, new efforts are needed to increase the number of phobia sufferers who seek treatment.

In a recent study, Garcia-Palacios, Hoffman, Kwong See, Tsai, & Botella (2001) surveyed a total of 777 undergraduate students. Participants read a brief general description of how exposure therapy works, and were asked about their willingness to get involved in two different ways of applying the therapy to spider phobia, in vivo exposure or virtual reality (VR) exposure. Garcia et al. found that people high in fear of spiders (over one SD above the sample mean on a fear of spiders questionnaire) strongly preferred VR exposure treatment (81% in study 1 and 89% in study 2) compared to in vivo exposure therapy. Furthermore, in study 2, only 8% of fearful students said they would ‘absolutely not’ be willing to come in for three, one-hour VR exposure therapy sessions, whereas 34% of fearful students said ‘absolutely not’ to one massed three-hour in vivo therapy session.

Immersive VR works as follows. The subject dons a ‘VR Helmet’ that positions two goggle sized TV screens close to the user’s eyes. Each eye gets a slightly different image of the virtual world. The image shown to the left eye is offset slightly from that seen by the right eye. The brain fuses these two images into a single 3-D image, helping to give users the illusion that the virtual environment has depth. Position tracking devices keep the computer informed of changes

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