W. E. (1994). The transtheoretical model of change and HIV prevention: A review. *Health Education Quarterly, 21,* 471–486.
Schiepek, G., Fricke, B., & Kaimer, P. (1992). Synergistics of psychotherapy. In G. Schiepek, W. Tschacher, & E. J. Brunner (Eds.), *Self organization and clinical psychology* (pp. 239–267). Berlin, Germany: Author.
Shapiro, D. A. (1996). Models of change in psychotherapy. *Current Opinion in Psychiatry, 9,* 177–181.
Siegler, R. S. (1994). Cognitive variability: A key to understanding cognitive development. *Current Directions in Psychological Science, 3,* 1–5.
Stiles, W. B., & Shapiro, D. A. (1994). Disabuse of the drug metaphor: Psychotherapy process-outcome correlations. *Journal of Consulting and Clinical Psychology, 62,* 942–948.
Thelen, E. (1995). Motor development: A new synthesis. *American Psychologist, 50,* 79–95.
Thelen, E., & Smith, L. B. (1994). *A dynamic systems approach to the development of cognition and action.* Cambridge, MA: MIT Press.

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# Computer-Assisted Therapy in the Treatment of Flight Phobia: A Case Report

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*The efficacy of computer-assisted exposure (CAE) therapy for the treatment of flight phobia was examined. The subject was a 34-year-old man with severe fear and almost complete avoidance of flying. Six 50-minute CAE sessions and two 20-minute booster sessions were conducted over a period of 1 month. All self-reported measures of the fear of flying decreased following CAE, and before the subject took a one-hour flight with minimal distress. A follow-up after 6 months revealed that he had flown three times without anxiety. The implications of CAE for treatment of flight phobia are discussed.*

FLIGHT PHOBIA is characterized by intense fear of flying, an immediate anxiety response upon exposure to situations related to flying, and avoidance of such situations (American Psychiatric Association, 1994). Epidemiological studies estimate that 25% of the general adult population experiences fear of flying (Dean & Whitaker, 1980) and the point prevalence rate for flight phobia ranges from 2.6% to 10.0% in the general population (Ekeberg, Seeberg, & Ellestern, 1989; Fredrikson, Annas, Fischer, & Wik, 1996; Öst, 1996). Despite this high prevalence rate, in comparison to other phobias, there have been relatively few studies on the treatment of flight phobia (Haug et al., 1987). Controlled studies suggest that behavioral anxiety-management strategies, especially those that include some kind of exposure, can be effective in the treatment of flight phobia (Beckham, Vrana, May, Gustafson, & Smith, 1990; Capafóns, Sosa, & Avero, 1997; Denholtz & Mann, 1975; Girodo & Roehl, 1978; Howard, Murphy, & Clarke, 1983; Solyom, Shugar, Bryntwick, & Solyom, 1973; Walder, McCraken, Herbert, James, & Brewitt, 1987). For example, Öst, Brandberg, and Alm (1997) demonstrated a short, intensive in vivo exposure treatment to be highly effective in the treatment of flight phobics who had previously avoided flying.

Though in vivo exposure to flying appears to be quite effective, the difficulty and expense of in vivo flight exposure have daunted many researchers and therapists (Rothbaum, Hodges, Watson, Kessler, & Opdyke, 1996). These difficulties have led researchers to attempt to simulate the feared flight situations in a realistic and vivid way. First tried in the 1970s, simulated exposures using slide projectors yielded promising results (Denholtz & Mann, 1975; Solyom et al., 1973); however, over the next 15 years, few studies further investigated simulated exposures for flying phobia. Perhaps practical problems, such as difficulties integrating images and sounds, controlling the stimulus presentation, recording patients' self-reported anxiety, etc., limited the application of this exposure strategy. The rapid development of new technologies that can easily address the limitations of slide presentations has again led researchers to develop new simulated exposure treatments. Possible benefits of comprehensive simulated exposure programs include reducing therapist contact time, standardizing treatment, and facilitating dissemination (Newman, Consoli, & Taylor, 1997). In addition, sim-

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ulated exposure might be useful for those patients who are reluctant to enter an in vivo exposure therapy.

The newest technology to be used to simulate feared stimuli is virtual reality (VR; Glantz, Durlach, Barnett, & Aviles, 1996; North, North, & Coble, 1997). In a number of case studies, VR has been used to assist in the treatment of a wide variety of conditions (i.e., Carlin, Hoffman, & Weghorst, 1997). Specifically, Rothbaum et al. (1996) presented a case study in which VR exposure was successfully used as a key component in the treatment of a flight-phobic patient.

Another possibility for flight simulation is the use of computer programs. Newman et al. (1997) reviewed a number of studies in which computer technologies have been successfully applied in the treatment of anxiety disorders. In a recent example, Coldwell et al. (1998) described a computerized, exposure-based therapy program for the treatment of dental injection fear that was effective in reducing this fear in a small sample. Currently, there are a number of advantages of computer-assisted therapy programs in comparison to VR. Computer technology is more widely distributed and less expensive than VR. It is relatively easy to divide computer programs into many components and combine components to meet the idiosyncratic needs of each patient. Computer programs can include treatment components other than exposure. Finally, if the patient has a personal computer, the computer program can be used by the patient at home.

To date, there are no published studies investigating the effectiveness of computer simulated exposure in the treatment of flight phobia. This paper describes the development and application of the Computer Assisted Fear of Flying Treatment (CAFFT) and its application in a case study. CAFFT is a simulated exposure treatment that re-creates various flight situations with pictures and sounds presented on a computer. It was hoped that CAFFT would prove to be an efficient and cost-effective treatment for flight phobia. The long-term goal of the CAFFT research is to develop a truly computer-driven treatment that can be self-applied at home with minimal psychological advice.

## Method

### Subject

The subject was a single 34-year-old Caucasian man with severe fear and avoidance of flying. He lived on an island in the Mediterranean, and his profession required flying several times per year. Moreover, advancement in his career required additional flying. He had recently turned down a promotion because of his fear of flying, and in the last 5 months he had canceled four previously booked flights. He met *DSM-IV* (American Psychiatric Association, 1994) criteria for a specific phobia (flying). The patient had no history of other psychiatric disorders, was not taking psychotropic medication, and had received no previous treatment for the flight phobia. He could not recall a specific event involved with the onset of his phobia, 4 years before.

### Assessment and Outcome Measures

*Anxiety Disorders Interview Schedule (ADIS-IV).* The ADIS-IV (Brown, DiNardo, & Barlow, 1994), administered prior to treatment to establish the patient's diagnosis, is a comprehensive structured diagnostic interview designed to assess the history of occurrence of any anxiety disorder and other related disorders in accordance with the *DSM-IV.*

*Fear of Flying Questionnaire–Revised (FFQ-R).* The FFQ-R (Bornas, Tortella-Feliu, García, Fullana, & Llabrés, 1999) is a 30-item self-report instrument on which a patient rates the level of fear or discomfort he experiences in different flight-related situations on a 9-point Likert scale. The FFQ-R is a slightly modified version of the FFQ (Bornas & Tortella-Feliu, 1995). Four questions were subtracted and two added to the original version to better define the subscales. The FFQ-R consists of three subscales assessing (a) anxiety during flight; (b) anxiety experienced before boarding the plane; and (c) anxiety caused by vicarious exposure to neutral and catastrophic flying situations not directly related to the patient. The original FFQ has sound psychometric properties. Test-retest reliability ($n$ = 174, test-retest interval = 15 days) was .96, .97, and .92 for each of the subscales, and Cronbach's alpha equaled .97 for the whole questionnaire. It proved to be useful in discriminating between phobic and nonphobic subjects and was sensitive to change with treatment (Bornas & Tortella-Feliu). Initial analysis of the FFQ-R suggests that it also has sound psychometric properties (Bornas et al.). Among a sample of 520 adults, Cronbach's alpha equaled .96. In addition, factor analysis yielded the same factor structure as the original FFQ. Possible scores on the FFQ-R range from 30 to 270. Scores in the sample ranged from 30 to 234. The distribution was positively skewed (mean = 77.55; median = 63; mode = 30; $SD$ = 45.84), which was expected given that FFQ-R is a measure of distress. The means and standard deviations in the normative sample as well as in the nonphobic subsample for each subscale are presented in Table 2 to facilitate comparison with the subject's scores. The FFQ-R was administered before and

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