Computer-Assisted Exposure Treatment for Flight Phobia

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Abstract

This review introduces the state of the art in computer-assisted treatment for behavioural disorders. The core of the paper is devoted to describe one of these interventions providing computer-assisted exposure for flight phobia treatment, the Computer-Assisted Fear of Flying Treatment (CAFFT). The rationale, contents and structure of the CAFFT are presented and data on the efficacy and clinical utility of CAFFT are also provided.
Key words: Computer-assisted treatments; brief cognitive-behavioural treatments; specific phobia; flight phobia

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New information and communication technologies, especially computers, have opened up unforeseen possibilities in conducting psychological interventions, e.g., they have made it easier for the general population to access treatment and for clinical researchers to interpret studies, control non-specific variables and compile data (McMinn, 1998; Norton, Asmundson, Cox, & Norton, 2000).

This article refers to second generation technological advances with clinical impact (McMinn, 1998) i.e., computer-assisted treatments (CAT), with special attention to its application to flight phobia

Types of computer-assisted treatment

Since the late 1980s different types of CAT have been developed for treatment of a wide range of clinical problems. Moreover, the use of personal computers and software that facilitate their use have become widespread during this period. The emergence of CAT as an intervention strategy is also related to developments in clinical psychology: on the one hand, the ideal nature of cognitive-behavioural procedures in programming computerized treatments (their structured, systematic nature and focus on specific conducts (Newman, Consoli, & Taylor, 1997) and on the other, the efforts to streamlining existing effective cognitive-behavioral treatments to make them more efficient, cost-effective, and affordable (Hazlett-Stevens & Craske, 2002). The most common way to enhance the efficiency has been to reduce the number of sessions of existing treatment protocols and make them briefer. CAT are another way to attempt to improve the efficiency of existing treatments.

Regarding contents, there are three basic kinds of CAT programs, aside from those that increasingly make use of the Internet (e.g., Schneider, Mataix-Cols, Marks, & Bachofen, 2005): (a) computerized versions of self-help programs or patient manuals for self-applied treatments with minimal therapeutic contact, (b) telephone-administered treatment programs with interactive voice response systems and finally, (c) treatments that use computers to reproduce the natural setting in which patients display problematic behaviors (e.g. virtual reality treatments). It should be noted that in some cases, regardless of CAT type, computerized treatment is the only intervention modality, whereas in others it is used to complement treatments that include face-to-face therapeutic contact. In the section below a brief review of the main features of CAT programs and its applications is presented.

Computerized self-help programs and patient manuals

They are the most thoroughly developed CAT and focus on a wide range of problems: phobic disorders, obsessive-compulsive disorder, generalised anxiety disorder, depression and alcohol and drug abuse.

These treatment programs use personal computers or personal digital assistants (PDA) as support. The structure and contents are essentially the same as those found in self-help manuals for specific problems or patient manuals that often accompany standardised treatments. Assessment tools and their automated correction are usually included in the program as a part of the algorithms that control the types of activities that patients are instructed to carry out in each treatment stage.

The computer program guides treatment for self-application in the same way that a programmed instruction text (manual-driven treatments) on paper format. Thus, it could be understood as a substitute for the therapist. The main difference lies in interactivity, which is incorporated in diverse degrees, and in the inclusion of multimedia in the most recent applications. The level of interactivity and feedback that such programs can offer are believed to overcome many of the disadvantages of traditional self-help or patient manuals on paper format (Riley & Veale, 1999).

The efficacy of computerized self-help programs has been established in a number of randomized controlled trials and it is similar to face-to-face therapy,

In other cases, computer technology has been used to complement traditional interventions including direct therapeutic contact. In these cases, the number of face-to-face sessions has been reduced and most of the treatment takes place outside the office with the assistance of a laptop or, more often, a PDA. This modality was used for the first time to treat two treatment-resistant individuals with obsessive-compulsive disorder (Baer, Minichello, & Jenicke, 1987; Baer, Minichello, Jenicke, & Holland, 1988).

Its efficacy for the treatment of social phobia, panic disorders , depressive disorders and generalized anxiety has also been demonstrated (Gruber, Dwell, Roth, & Taylor, 2001; Gruber, Taylor, & Roth, 1996; Marks et al., 2003; Marks, Kenwright, McDonough, Whittaker, & Mataix-Cols, 2004; Newman, Consoli, & Taylor, 1999; Newman, Kenardy, Herman, & Taylor, 1996, 1997) and, in general, the outcomes were equivalent to face-to-face treatment.

Several studies indicate that treatments which combine face-to-face sessions with a therapist and computer-assisted intervention are more effective than computer-assisted alone, achieving higher completion rates and fewer drop-outs (Newman et al., 1997), although the results are not always consistent (Gruber et al., 2001). Overall, results suggest that computerized treatments are a good way to reduce the number of direct therapeutic contact hours without undermining efficacy or effectiveness.

Self-help programs with interactive voice response systems

This kind of CAT combines the use of a patient's manual in paper format with phone calls to an interactive voice response system that can be accessed from any dial tone telephone. The system includes taped messages based on the patient's demands that guide him/her through the type of activities to be carried out. The interactive voice system is also used for patient assessment at different treatment stages. This procedure has been used with remarkable success in the COPE program to treat mild depression (Osgood-Hynes et al., 1998) and in the BT Steps program to treat obsessive-compulsive disorder (Marks et al., 1998). Despite its efficacy, this type of computer-assisted intervention has not been as widely disseminated as might be expected.

Computer-assisted exposure programs

This type of computer-assisted intervention uses computers to treat phobic disorders through exposure-based techniques (computerized exposure) and thus, is one of the variants of exposure techniques. The aim is not to guide in vivo or imaginary exposure through instructions supplied by the computer program, but to tailor the stimuli (images, sounds) to the stimuli feared by the patient. The program devises an exposure hierarchy based on the automated evaluation of the person who is to undergo treatment and determines the conditions (duration, sequencing, etc.) in which the confrontation with fear-inducing stimuli that will appear in the computer's output devices are to be conducted.

The first work on computerized exposure, which studied two children with a phobic fear of spiders, was published by Nelissen, Muris, & Merckelbach (1995). The program was very rudimentary; the exposure hierarchy was not personalised and duration was predetermined at one hour, after which live exposure was proceeded to. The intervention was not effective.

Coldwell and his collaborators (1998) developed a very complex program shortly afterwards to treat fear of dental injections that combined exposure to images of paediatric dental interventions with relaxation training and cognitive techniques to control activation. It also included a module for the dentist or dental hygienist who guided their actions when patients decided to expose themselves to the situation, once the computerized exposure stage had concluded. The treatment was shown to be very effective after the treatment and at a one-year follow-up.

The University of the Balearic Islands' Neurodynamic and Clinical Psychology Research Group has worked systematically to develop and analyse computer-assisted exposure, specifically in treating the fear of flying. The following sections analyse its contributions in detail.

We think that computer-assisted exposure has not been as thoroughly developed as it might have been, most probably because of the parallel advent of virtual reality in treating psychopathological disorders. This is a technology that most behavioural researchers have found much more appealing and that intuitively appears to be of greater use in promoting behavioural change.

Computer-assisted exposure for fear of flying

In vivo exposure is the treatment of choice for specific phobias. Despite that, there is only one randomized controlled trial on the effectiveness of in vivo exposure in fear of flying (Öst, Brandberg, & Alm, 1997). Unlike other phobias, the difficulty and expense of conducting this type of intervention have made most clinicians and researchers practically discard its application and have encouraged several research groups to develop the most realistic and vivid simulations possible of flying conditions. Simulated exposures were first used with very promising results in the 1970s, when slides were presented and, in some cases, sounds related to flight conditions were reproduced (Denholtz & Mann, 1975; Solyom, Shugar, Bryntwick, & Solyom, 1973). However, practical problems at the time, such as the difficulties involved in integrating sounds and images and the therapist's control of the stimuli, etc., made disseminating this strategy very difficult during more than twenty years. For an exhaustive review of fear of flying treatments, see Tortella-Feliu & Fullana (2001, 2006) and Fullana & Tortella-Feliu (2002).

The dissemination of new information and communication technologies that have enabled these limitations to be easily overcome since the 1990s have made it easier for researchers to develop new simulated exposure treatments. The use of these new technologies in treating fear of flying, and other

behavioural disorders boasts remarkable advantages beyond strictly therapeutic and effectiveness-related ones: a reduction in direct therapeutic contact time, the possibility of standardising treatment to the maximum, the low cost – which allows a greater extension - and, perhaps most importantly, access to patients who would not be very willing to subject themselves to live exposure (a real flight) with a steep exposure gradient (Botella, Baños, Perpiñà, & Ballester, 1998). The application of cognitive-behavioural procedures such as exposure through interactive computer programs, such as the one indicated above, is also especially recommended.

The use of computer-assisted exposure programs in stimulating phobic stimuli configurations is an alternative to virtual reality that has proven its efficacy in treating fear of flying on repeated occasions (Botella, Osma, García-Palacios, Quero, & Baños, 2004; Maltby, Kirsch, Mayeres, & Allen, 2002; Mühlberger, Herrmann, Wiedemann, Ellgring, & Pauli, 2001; Mühlberger, Weik, Pauli, & Wiedemann, 2006; Mühlberger, Wiedemann, & Pauli, 2003; Rothbaum, Hodges, Smith, Lee, & Price, 2000). As mentioned above, computer-assisted exposure treatments use specific software to confront patients gradually with their fears by displaying images and real sounds related to feared stimuli conditions on a personal computer screen.

Our research group has designed and evaluated the efficacy (Bornas, Fullana, Tortella-Feliu, Llabrés, & García de la Banda, 2001; Bornas, Tortella-Feliu, Fullana, & Llabrés, 2001; Bornas, Tortella-Feliu, & Llabrés, 2006), effectiveness (Bornas et al., 2002) and predictive variables of the therapeutic outcomes (Fullana & Tortella-Feliu, 2001) of the different versions and application procedures of the CAFFT (Computer-Assisted Fear of Flying Treatment) computer program, which will be described below, and has conducted psycho-pathological research on different aspects involved in fear of flying (Fullana & Tortella-Feliu, 2000; Tortella-Feliu & Fullana, 2000; Tortella-Feliu, Fullana, & Bornas, 2000, 2001; Tortella-Feliu & Rubí, 2000) and on the psycho-physiological responses to simulated exposure (Bornas, Llabrés, Noguera, & Lopez, 2006; Bornas et al., 2004, 2005).

The Computer-Assisted Fear of Flying Treatment (CAFFT)

The Computer-Assisted Fear of Flying Treatment (CAFFT) is a computer program that allows people who are afraid to fly to be exposed to images and sounds related to their phobic fears on a standard personal computer. The treatment is applied with minimum direct therapeutic contact and can even be totally self-applied. The average time of effective exposure less than four hours. This article describes the program's latest version: the CAFFT2.2 (Bornas, Tortella-Feliu & Llabrés, 2003).

One of the starting points is that flights may be broken down into a series of chronological events with certain critical moments. The CAFFT2.2 divides the flight process into five sequential stages: (1) flight preparation, (2) a series of activities immediately prior to flying on the day of the flight, (3) boarding and takeoff, (4) the central part of flight and (5) the airplane's descent and approach to the runway and landing. In addition to those five, the CAFFT includes a sixth sequence with images and auditory stimuli related to plane crashes. Exposure to this sequence is included because anxiety about possible accidents is a key component in the fears of most flying phobics.

Although many people who fear flying normally experience anxiety during all the phases in the process, many display idiosyncratic patterns in terms of intensity at different points in that process. In other words, fear is notably more intense at certain critical moments than at others. The first time patients access the program, they complete the Fear of Flying Questionnaire (QPV-II) (Bornas & Tortella-Feliu, 1995; Bornas, Tortella-Feliu, García de la Banda, Fullana, & Llabrés, 1999), which is part of the CAFFT, and the CAFFT automatically configures their fear hierarchies on the basis of their self-reported responses. Each item in the QPV-II is associated with an exposure sequence. The CAFFT calculates the average score for each flight phase and presents the sequences according to these ratings (from least to

most). Every sequence is made up of a chronological series of photographs (at home, at the airport terminal, when boarding, etc.) and sounds directly recorded in the real settings in which they were generated – we wish to emphasise that sounds seems to play a crucial role in this phobia (Bornas et al., 2005) – which are reproduced on personal computers. For example, the flight preparation sequence begins with three photographs of the facades of different travel agencies with the corresponding sounds of the street on which the snapshots were taken. The following photograph is inside one of the agencies and the patient can hear typical office noises (a ringing telephone, typing, an employee talking...). The first sequence continues with images that show an open suitcase with clothes inside on a bed and the airplane ticket beside it, then the closed suitcase near the front door of the house and finally, a photograph of the airport bus at a bus stop. The composition of the different sequences and their duration are described in table 1.

Table 1: Contents, composition and duration of the exposure sequences in CAFFT2.2.

Exposure sequence	Beginning of the sequence	End of the sequence	Nº photographs	Duration (minutes)
1	Buying the ticket at a travel agency	Packing the suitcase at home	10	1.51
2	Trip to airport	Waiting for take-off in the plane	16	2.49
3	Safety instructions from the flight crew	Take-off and ascent	16	2.17
4	Airplane in flight (cruising)	Inside the plane in flight	14	2.17
5	Landing announcement	At the airport arrivals terminal	17	2.06
6	Flight accidents		10	2.18
Additional exposure in special conditions	After exposure to the above sequences, patients can choose additional exposure to night-time or adverse weather.		Same as in regular sequence	Same as in regular sequence

After each sequence has been presented, the patient must rate the level of anxiety experienced during the confrontation on a 1-9 Likert scale. The program repeats the same sequence until the patient reports that anxiety has fallen to only one or two points on that scale. Once habituation has taken place, the program proceeds to the following sequence in the personal fear hierarchy. The computer-assisted exposure treatment ends when habituation to the CAFFT's six sequences is achieved. At this point, the

patient can choose to receive additional exposure (the over-exposure phase) to one of the six sequences - the one he selects, considering the situation which he thinks will produce the greatest anxiety - before taking a real flight. Immediately after answering the QPV-II in the pre-treatment evaluation, the program asks patients to indicate whether flying at night and/or under adverse weather conditions increases the fear experienced. If so, the patients are then over-exposed to the images and sounds that reproduce these special conditions within the selected sequence that is made up of the same number of photographs with the same duration as those used in the regular exposure phase.

Finally, the CAFFT2.2 program also includes a very detailed on-line help tool that allows total self-application. This tool, which is made up of responses to 38 possible questions, includes a range of information on the logic behind the treatment, general application conditions, suggestions for overcoming some of the difficulties that may appear during exposure and recommendations on the process to be followed once exposure has concluded.

The CAFFT's efficacy and effectiveness

In order to evaluate the CAFFT's efficacy and effectiveness, Bornas' research group and collaborators conducted a series of studies following the "hourglass" process used in research validating psychological treatments (Salkovskis, 1995). The first systematic attempt to test the CAFFT's usefulness was a single case study. In view of the promising results, the program was then evaluated in a randomized controlled trial in which we compared our computer exposure procedure both with a multi-component program that has a structure and content typical of those offered by airlines and companies working in this field (van Gerwen, 2003) - which included aeronautical information, activation control techniques and finally, CAFFT- assisted exposure - and with a waiting list control group. On the basis of this study's outcomes and in order to overcome some of its limitations and clarify certain aspects considered of special interest for its subsequent extension to ordinary clinical practice outside CAFFT research laboratories, a second randomized controlled trial was designed in which the CAFFT's efficacy was compared with a multi-component intervention program that did not include any type of systematic exposure strategy. Finally, we analysed the CAFFT's effectiveness in an open clinical context in two different and socio-culturally distant countries with new therapists who had not been involved in the program's development in any way. The most outstanding results of these studies are summarised in table 2.

Table 2, Next Page!

Table 2: Studies on the CAFFT's efficacy and effectiveness

Study	CAT application conditions	Design	Main outcomes
Bornas , Fullana et al. (2001)	First version of the CAFFT Pentium 133 Mhz, 32 MB RAM Projected on a 100x75 cm screen Immersive conditions 8 exposure sessions in 4 weeks with therapeutic assistance.	Single-case study. Patient with a severe specific situational phobia (flying) with high interference. Complete avoider.	Recovery Flight without any significant discomfort, fear scores within the normal population's range. Results maintained at follow-up.
Bornas, Tortella-Feliu et al. (2001)	First version of the CAFFT Pentium 133 Mhz, 32 MB RAM Projected on a 100x75 cm screen Immersive conditions 2 sessions per week with therapeutic assistance	Randomized controlled trial. CAT (n=15) IRCAT (n=18) WLC (n=17)	*Completed treatment*: 100% CAT, 72% IRCAT *Flying after treatment:* 93% CAT > 50%IRCAT > 12% WLC *Self-reported fear of flying:* CAT > IRCAT > WLC Results maintained at follow-up.
Bornas et al. (2002)	First version of the CAFFT And the German version of the CAFFT **Study1**: Son Sant Joan Airport 21-inch screen Pentium II 400 Mhz 128 RAM **Study 2**: University of Tubingen (Germany) LCD Projector, 150 x 150 cm Screen Pentium II 400 Mhz 128 RAM 2 sessions per week with therapeutic assistance	Open CAFFT Study Study 1 (n=12) Study 2 (n=8)	*Completed Treatment:* 95% *Flying after treatment* 100% of Those who completed treatment. *Self-reported significant reduction in fear:* 90% *Average time of effective exposure:* 3.2 hours.
Bornas, Tortella-Feliu et al. (2006)	CAFFT 2.2. 17-inch screen PowerMac 6500, 64 MB RAM Intervention guided by self-help included in the computer program, minimum therapeutic assistance, a maximum of 6 CAT sessions, no accompanied flight.	Randomized controlled trial, blind external evaluators CAT (n=19) 6 sessions at most MNE (n=21) 6 sessions	*Completed treatment:* 100% CAT. 100% MNE *Flying after treatment:* 57.9% CAT. 76.2% MNE *Flying at follow-up*: 76.2 CAT. 57.9 MNE *Self-reported reduction in fear of flying*: CAT=MNE: size of the CAT's effect (3.6 at the end: 3.8 at the 6-month follow-up) Clinical/6 months (improvement and recovery): 92.3% CAT, 78.9% MNE *Average duration of exposure*: 4.11 sessions of 50'.

CWL = Wait-list control; IRCAT = information, relaxation, computer-assisted treatment; MNE = multi-component intervention without exposure; CAT = Computer-assisted treatment; </> = more or less than.

We concluded from the first controlled study (Bornas, Tortella-Feliu et al., 2001) that both computer-assisted exposure treatment and the multi-component program are more effective than a waiting list. More importantly, the additional strategies (aeronautical information and activation control techniques) that are part of the multi-component program do not increase the effectiveness of the CAFFT. Moreover, the CAFFT has a lower drop-out rate than the multi-component intervention, since it is briefer and less expensive.

Nevertheless, because of the very nature of the experimental design used, analysing the role of computerized exposure suitably and in certain detail is a complex matter, firstly, because the CAFFT was also an integral part of the multi-component program, secondly, because of the interventions' different durations and finally, because both interventions included a flight accompanied by a therapist at the end. Although the data analysis very clearly shows that this flight does not help reduce self-reported fear, but rather that its decline is totally attributable to the treatment itself, we cannot consider these flights a good indicator of success as a behavioural test. We also wish to mention that exposure was conducted in immersive conditions (dark room, LCD projector to display the images on a 100 x 75 cm screen located 2 metres from the patient's face, presentation of sounds with earphones and restriction of the lateral field of vision through separating screen placement), both in this first controlled study as in the single-case study.

The second controlled study (Bornas, Tortella-Feliu et al., 2006) was primarily aimed at specifically analysing the role of computerized exposure, which is why the CAFFT was compared with a multi-component program that did not include any type of exposure. The duration of the treatments was also the same (6 sessions), but the application conditions for the computer-assisted exposure varied significantly: the CAFFT 2.2 version with self-help was used, which allowed therapist interaction to be drastically reduced, exposure took place on the computer screen in a brightly-lit, completely open room (the study on the CAFFT's clinical usefulness, some aspects of which will be commented on below, stated that the results obtained in these conditions were equivalent to those achieved through exposure with LCD projectors in immersive conditions) and the end-of-treatment flight was taken without a therapist. As can be seen in table 2, the results indicate that the two interventions reduced fear of flying to a similar extent and that improvement was maintained at the six-month follow-up. As for the CAFFT, its application in low immersion conditions and with less direct therapeutic guidance (in other words, less therapeutic contact time) did not reduce its efficacy in any way. In cost-efficiency terms, we can affirm that the CAFFT is preferable to other alternative treatments, taking into account the lower amount of time devoted by the therapist, who is not required to have a high level of training (the treatment was led by four therapists with varying degrees of experience and knowledge of the program, which did not affect the results in any way), which also allows the treatment's total duration to be reduced. The average duration of computer-assisted exposure was 4.11 sessions (*SD* = 1.24); i.e., patients who received this treatment concluded before the six pre-established sessions were over.

As mentioned earlier, previous work on the effectiveness of computer-assisted exposure (Bornas et al., 2002) attempted to evaluate its usefulness when conducted by non-expert therapists in open clinical contexts. We were also interested in ascertaining whether the CAFFT's application in less immersive conditions and without the use of a LCD projector (something that would make it easier to use in ordinary clinical practice) would affect the results. The study was made up of two coordinated studies: one conducted by our team at Son Sant Joan Airport's Fear of Flying Unit (Palma, Majorca) and the other led by a German research group at the University of Tübingen's University Clinic of Psychiatry and

Psychotherapy, which did not participate in developing the CAFFT, although it was experienced in virtual reality. Treatment was applied in both cases by psychologists with less than a year of clinical experience who were only briefly trained in the use of the software.

The results (see table 2) show that the reduction in fear of flying and effective exposure time are very similar to the results from the other studies on the CAFFT in which treatment was applied by expert therapists in more strictly controlled surroundings; they also show that there were no significant differences between the applications at the airport in Majorca and at the Swabian research centre.

Predictive variables of the therapeutic outcomes

Fear of flying is not a unitary fear, but rather is considered the expression of different underlying components, such as the phobic fear of accidents, heights and closed places, etc. (Howard, Murphy, & Clarke, 1983; van Gerwen, Spinhoven, Diekstra, & Dyck, 1997) or the expression of other non-situational phobias or panic-agoraphobia problems (McNally & Louro, 1992; Wilhelm & Roth, 1997). Therefore, we deemed appropriate to analyse whether this aspect, along with other variables (socio-demographic characteristics, phobia severity, associated anxiety-depressive symptoms, etc.), had any relevant relationship to the results of the CAFFT treatment.

Fullana and Tortella-Feliu (2001) found that only the fear of instability and fear of heights – some of the less frequent components of the fear of flying - were associated with less optimal results at the end of the treatment. However, the regression analysis reveals that only the fear of instability was capable of predicting the severity of fear of flying once the intervention had been concluded, explaining 40% of the variance. At the one-year follow-up, only the fear of flying once the treatment had been concluded was capable of predicting subsequent scores in self-reported fear. In relation to this, it was also observed that the higher the level of pre-treatment fear of pre-flight conditions (trip preparations, trip to the airport, check-in, etc.), the lower the level of self-reported fear in the follow-up . The CAFFT specifically addresses that kind of situation and interventions may be more effective in people who experience this kind of fear than in subjects who only display high levels of anxiety during the flight itself.

In exploring treatment outcome predictors, our group has worked in recent years on the psycho-physiological responses of people who fear flying within the framework of the dynamic systems of emotion regulation model (Bornas, Llabrés et al., 2006; Bornas et al., 2004, 2005). Bornas et al. (2004) found significant differences in involvement during exposure to flight-related sounds among people with low and high heart rate variability (HRV). It has also been shown that flying phobics with low HRV are more anxious during simulated exposure than phobics with high HRV (Bornas et al., 2005). These results indicate that it may be relevant to distinguish between people with high and low HRV to optimise the use of computer-assisted exposure treatments and, in general, any type of exposure intervention, which is why we are currently analysing changes in HRV patterns throughout the entire CAFFT treatment process.

The future of research on the CAFFT

As we said before, we want to further study predictive factors (Bornas et al. 2007) and those involved in the process of therapeutic change, largely on the basis of data from our second controlled study, in which a brief multi-component program without exposure obtained the same results as the exposure treatment, a fact already noted in several other studies (Marks & Dar, 2000; Schneider et al., 2005). The therapeutic change within the dynamic systems framework cannot be exclusively attributed to one sole psychological intervention, but rather it depends on the interaction between this intervention and the system and its dynamics. Thus, the crucial question is: Which interactions between techniques and subjects led to the emergence of more adaptive behavioural patterns or more effective self-organisation patterns? We believe that the analysis of psychophysiological response patterns may shed light on this

question. In a recent study (Bornas et al. 2007), we compared two heart rate measures, variability and entropy, and tried to evaluate their significance as predictors of treatment outcome in flight phobia patients. Despite some limitations, our results suggest that heart rate entropy may have a role in the prediction of outcome and further research in this area seems warranted.

Furthermore, we are still awaiting a study of the CAFFT's efficacy in its totally self-administrated version (at the patient's home without any direct therapeutic contact whosever). One of our main objectives when we began developing the CAFFT in the mid-1990s was, and still is, to devise a brief, effective, and efficient treatment for the fear of flying. We now have some anecdotal evidence that shows that the CAFFT is equally effective with total self-application and the second controlled study shows that the program achieves equivalent levels of effectiveness without constant therapeutic attention. In any case, a controlled study is required to evaluate the effectiveness of self-application, our project's last goal.

Lastly, the results of our studies indicate that the CAFFT's clinical improvement rates are equivalent to those achieved in virtual reality treatments for fear of flying. It would be interesting to directly contrast the differential efficacy of these two exposure variants and analyse their cost-efficiency, which would contribute relevant information on the greater or lesser need for highly immersive systems in achieving a heightened sense of presence and how they are related to interventions' therapeutic potential, since some data provide a glimpse of how the relationship is not always the one we intuitively assume it to be (e.g., Mühlberger et al., 2003, 2006).

The questions have now been raised. Time and dedication, perhaps, will provide some responses and undoubtedly raise new questions.

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