

SYSTEMATIC DESENSITIZATION IN THE TREATMENT OF FEAR OF FLYING

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Systematic desensitization in the treatment of fear of flying. In this work we present the preliminary results for the validation of a systematic desensitization programme applied to fear of flying. The programme is made up of three phases: the first consists of four sessions in relaxation and imagination training, the second phase has three sessions focusing on the elaboration of the phobic stimulus hierarchy (travelling by plane); the third, with a minimum of five and maximum of eight sessions, deals with the application of the systematic desensitization, together with stop thinking. The programme was applied to 20 patients (treatment group), while 21 patients made up the waiting-control group. Therapeutic success was assessed by means of self-report scales, clinical interview and the recording of psychophysiological variables in a simulation situation. The results obtained appear to support the validity of the programme.

Presentamos en este trabajo los resultados preliminares de la validación de un programa de desensibilización sistemática aplicado a la fobia a viajar en transporte aéreo. El programa consta de tres fases: la primera se compone de cuatro sesiones destinadas al entrenamiento en relajación e imaginación; la segunda fase contiene tres sesiones centradas en la elaboración de la jerarquía del estímulo fóbico (viajar en avión); y la tercera, con un mínimo de cinco sesiones y un máximo de ocho, está dedicada a la aplicación de la desensibilización sistemática, junto con detención de pensamiento. El programa se ha aplicado a 20 pacientes (grupo de tratamiento) y se dispuso de 21 pacientes en fase de espera (grupo control). La valoración del éxito terapéutico se ha llevado a cabo a través de escalas de autoinforme, entrevista clínica y registro de variables psicofisiológicas en una situación análoga. Los resultados obtenidos parecen apoyar la validez del programa.

Within the field of psychological treatment, few techniques have generated as many studies as systematic desensitization (SD). Today, it is almost impossible to find an unexplored angle with respect to the use of this technique. Nevertheless, a great deal continues to be said and written about it and, although less intensively and extensively, researchers commonly readdress some point or other in order to contribute to debate or make some clarification.

It is not our intention here to re-enter the classic controversy about the application of the technique or the theoretical explanations of its effectiveness (type of antagonistic response to use, the basic processes on which the success of the technique is based, etc.), aspects which were excellently reviewed in the early 1970s by Davison and Wilson (Davison and Wilson, 1973; Wilson and Davison, 1971) and by Wilkins (1971). Far removed

from this type of discussion, centred on theoretical bases, our concern is to be found within an approach whose fundamental aim is the validation of standardised intervention programs that permit the greatest possible success in the specific treatment of phobias, especially fear of flying. The purpose of this study, therefore, is to offer some preliminary conclusions about the assessment of the therapeutic success of systematic desensitization applied to this type of specific phobia.

We consider SD to be a technique that is especially useful in the case of fear of flying, for several reasons:

1. Confrontation-exposure to the phobic stimulus in the case of this phobia is not enough to eradicate the fear reaction. There are patients who have to take an average of 30 to 40 two- or three-hour flights per year, and who do not succeed in eliminating the phobic behaviour. SD incorporates the exposure, but impregnated with the sensation of self-efficacy, since the patient exposes him/herself to the phobic stimulus feeling that he/she can control the situation.
2. The fact that the SD technique can be applied in images means that many of the disadvantages involved in *in vivo* exposition with this type of phobia can be eliminated.

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3. SD is a treatment method that increases the feeling of self-control; that is, the therapist suggests, guides or helps, but does not represent the nucleus of the treatment. The risk of dependence upon the therapist or of perceiving improvements as being external to the patient are thus minimised in this technique.
4. SD also minimises the unpleasant effects of exposition. This technique, due to its progressive structure, allows the patient to control the steps he/she must make until fear is overcome. This absence of disturbing elements makes this technique less likely to provoke abandonment of the therapy.

SD is thus a treatment method that has not gone unnoticed in this field of application. On the contrary, it is one of the most commonly employed strategies in the few existing studies on the treatment of this type of phobia (Canton, 1974; Howard, Murphy and Clarke, 1983; Sank, 1976; Scrignar, Swanson and Bloom, 1973;). In short, SD is already a classic technique, which can contribute greatly to the elimination of phobias. The results of our study help to confirm that SD, in spite of its veteran status –or perhaps because of it– continues to be an effective strategy in the treatment of maladjusted fears.

METHOD

Sample

The sample of this study consists of 41 people with fear of flying: 20 were randomly assigned to the treatment group and 21 to the waiting-control group. The two groups were arranged so as to make them balanced in terms of sex, age, self-reported fear level and analogous psychophysiological measures. Thus, the treatment group was made up of 8 males and 12 females, with a mean age of 29.65 (DT = 6.22); the waiting-control group was made up of 9 males and 12 females, with mean age 34.05 (DT = 9.52).

Patients were recruited as a result of a media campaign (radio, press and television) set up by the research team, which informed of personal intervention programmes (free of charge) aimed at treating fear of flying.

Instruments

The following instruments were used:

- a) *Información Diagnóstica General sobre Fobia a Volar* (IDG-FV) (General Diagnostic Information on

Fear of Flying) (Capafóns, 1991): general anamnestic interview to obtain data about patient's life history and about aspects related to fear of flying.

b) *Fear of flying scales:*

1. *Escala de Miedo a Volar* (EMV) (Fear of Flying Scale) (Sosa, Capafóns, Viña and Herrero, 1995), which measures degree of anxiety perceived in relation to different flight situations.
2. *Escalas de Expectativas de Peligro y Ansiedad para el Miedo a Volar* (EPAV-A and EPAV-B) (Scales of Expectations of Danger and Anxiety) (Sosa, Capafóns, Viña and Herrero, 1995): these two measure the frequency of various catastrophic thoughts and the occurrence of different physiological manifestations that may present themselves in the flight situation.

c) *Videotape of a plane trip* (Capafóns, Sosa, Herrero and Viña, 1993): a video made from a subjective perspective about a trip by plane, which begins with the traveller packing his/her case and ends with the plane touching down at its destination.

d) *Psychophysiological recording instruments:*

Cardioback (heart rate measure): LE 135 Cardioback biofeedback from Letica Scientific Instruments; Mioback (muscular tension measure): LE 136 Mioback biofeedback from Letica Scientific Instruments; Thermoback (skin temperature measure): LE 137 Thermo biofeedback from Letica Scientific Instruments.

Measures of the dependent variables

The measures taken in the pre and post-treatment assessments were the following:

- a) Answers to three questions from the IDG-FV:
 1. *How afraid of flying would you say you were?* (answers: not at all, a little, very, extremely).
 2. *Do you travel by plane when there is no alternative way to travel?* (answers: "I'm not afraid –I always fly"; "Yes, but I get a little afraid"; "Yes, but I get quite afraid"; "Yes, but I'm terrified"; "No, never").
 3. *Whilst flying, have you ever had any of the following symptoms or feelings?* This question contains a list of 21 disagreeable effects (sweating, tachycardia, muscular tension, feelings of loss of control, etc.). For each item on the list there are 4

possible answers (“No”, “Sometimes”, “Many times”, “Always”).

b) The three EMV scales:

1. *Fear during the flight*: this contains 9 elements related to situations that occur from the moment of take-off acceleration to touchdown.
2. *Fear of flight preliminaries*: this includes 8 situations that are preliminary to the actual flight (going to the airport, obtaining boarding card, etc.).
3. *Fear without involvement*: this contains 4 elements related to flying in which there is not direct personal involvement (seeing an aeroplane flying, seeing one on television, etc.).

c) The two EPAV scales:

1. *Catastrophic thoughts*: 9 elements that contain highly disturbing thoughts (fear of the engines catching fire, fear of a wing falling off, etc.).
2. *Physiological anxiety*: 10 elements that refer to disagreeable psychophysiological manifestations.

d) Heart rate, palm temperature and muscular tension during take-off in the simulation. Measures recorded here are divided for each subject by the baseline measures (obtained in the absence of the phobic stimulus).

Post-treatment measures were taken after the patient had taken two flights (outward and return journeys of the same trip). The first flight was to take place in the 7 days following the treatment. Psychophysiological recording of heart rate, palm temperature and muscular tension during take-off in the simulation, however, was made before the flight, in order to balance the two groups in terms of the presentation conditions for this test.

Procedure

All those participating in this study were interviewed individually by members of the research team. In this interview subjects completed the IDG-FV, and in subsequent sessions the rest of the measures were taken using the self-report method. Subjects were later called back for the administration of the psychophysiological assessment in the simulation situation (video-tape), which took place in the university's Department of Personality, Assessment and Psychological Treatment. These sessions were also individual, carried out in a room of some 5 x 3.5 metres at a temperature of 22.5° C ($\pm 1^\circ\text{C}$). The subject sat in an armchair 1.8 metres from a television.

Once seated, the apparatus for recording psychophysiological responses was behind the subject.

Before the viewing of the video there was a habituation session, in which the patient became acquainted with the application conditions of the simulation situation. In the assessment and recording session proper – his/her physiological responses having previously stabilised–, the patient's psychophysiological responses were measured for a three-minute period in the absence of the phobic stimulus. The patient then proceeded to watch the video, and was told to feel as involved as possible. At the end of the session, a new interview appointment was made, for presenting the treatment to be followed, (in the case of the treatment group), or for the next assessment session (in the case of waiting-control group subjects). In either case the interval between the first session and the second was approximately eight weeks for all the measures.

The treatment was also carried out in the Department, in a room 2.5 x 3.5 meters in size, which contained two seats, a table and a relaxing armchair. Patients had two 1-hour (approx.) sessions per week, as part of a standardised individual desensitization programme of minimum 12 and maximum 15 sessions. In addition to training in techniques of breathing, progressive relaxation and imagination, the treatment combines imagination and *in vivo* elements, the main differences from the original model being the emphasis on hierarchy –which is elaborated using cardinal and ordinal procedures– and the systematic use of the technique of stop thinking and of brief relaxation, applicable in natural situations where the phobic stimulus is present.

RESULTS

We shall now proceed to a description of the results obtained from the differential analyses (Student t test intragroup and intergroup) and discriminant analyses (intergroup), of the self-report fear of flying scales –EPAV-A, EPAV-B, EMV–, of the responses to the three interview questions and, finally, of the simulation situation (video).

Intragroup analysis

Differential analysis of waiting-control group (before-after)

Table 1 shows the analyses carried out for the waiting-control group in the self-report scales, interview respon-

Table 1
Before-after t tests in waiting-control group with respect to self-report scales, interview questions and physiological anxiety responses (n= 21, mean ± standard deviation)

	Before	After	t
Fear during the flight	26.05±3.67	35.81±4.80	0.18
Fear of preliminaries	23.81±5.46	21.05±7.86	1.32
Fear without involvement	2.05±1.50	2.24±2.487	-0.30
Catastrophic thoughts	9.76±4.92	9.67±5.61	0.06
Subjective physiological anxiety	22.43±6.40	21.90±6.86	0.26
Fear level	2.52±0.51	2.71±0.46	-1.26
Avoidance behaviour	3.14±0.48	3.33±0.58	-1.16
Disagreeable responses	19.52±6.36	19.90±6.05	-0.20
Heart rate	1.07±0.10	1.05±0.09	0.67
Temperature	0.99±0.04	1.01±0.03	-1.38
Muscular tension	1.41±0.61	1.31±0.51	0.55

Table 2
Before-after t tests in treatment group with respect to self-report scales, interview questions and physiological anxiety responses (n= 20, mean ± standard deviation)

	Before	After	t
Fear during the flight	25.60±4.20	13.25±7.97	6.13***
Fear of preliminaries	21.50±7.68	10.15±7.51	4.73***
Fear without involvement	2.40±1.57	1.40±1.79	1.88
Catastrophic thoughts	10.30±4.17	5.00±2.64	4.81***
Subjective physiological anxiety	22.60±6.83	14.35±9.25	3.21***
Fear level	2.40±0.50	1.25±0.79	5.51***
Avoidance behaviour	2.95±0.60	1.25±0.85	7.28***
Disagreeable responses	19.00±7.20	8.70±8.03	4.27***
Heart rate	1.04±0.09	0.99±0.04	2.12*
Temperature	0.99±0.04	1.01±0.02	-1.79
Muscular tension	1.34±0.60	1.02±0.12	2.35*

Note: * p<0.05, **p<0.01, ***p<0.001

ses and physiological reactions in the simulation. As we can observe, the mere passing of time does not lead to quantitative change in any of the dependent variables considered in this study.

Differential analysis of treatment group (before-after)

Table 2 shows the analysis carried out on the treatment group in the “before” and “after” conditions for the same variables. The results suggest that significant changes take place, and in the expected direction, in both the self-reported variables and those of the interview; subjects’ performances in the psychophysiological measures during the simulation also improve significantly. Only in the measures of fear without involvement and skin surface temperature are significant differences not found.

Intergroup analysis

Waiting-control group versus treatment group before therapy

As already pointed out in the sample description, the results presented in Table 3 show the homogeneity of the two groups with respect to self-reported fear level and the objective analogous measures before the treatment.

Waiting-control group versus treatment group after therapy

The results of this comparison confirm the results obtained in the intragroup comparison. Scores are significantly different for each group for practically all variables analysed, with only two maintaining non-significant differences: fear without involvement and palm temperature.

Table 3
t tests in pretest between waiting-control group and treatment group with respect to self-report scales, interview questions and physiological anxiety responses (mean (standard deviation)

	Control group (n=21)	Treatment group (n=20)	t
Fear during the flight	26.05±3.67	25.60±4.20	0.36
Fear of preliminaries	23.81±5.46	21.50±7.67	1.11
Fear without involvement	2.05±1.50	2.40±1.57	0.74
Catastrophic thoughts	9.76±4.92	10.30±4.17	-0.38
Subjective physiological anxiety	22.43±6.40	22.60±6.83	-0.08
Fear level	2.52±0.51	2.40±0.50	0.78
Avoidance behaviour	3.14±0.48	2.95±0.60	1.14
Disagreeable responses	19.52±6.36	19.00±7.20	0.25
Heart rate	1.07±0.10	1.04±0.09	1.05
Temperature	0.99±0.04	0.98±0.04	0.62
Muscular tension	1.41±0.61	1.34±0.60	0.33

Table 4
t tests in post-test between waiting-control group and treatment group with respect to self-report scales, interview questions and physiological anxiety responses (mean (standard deviation)

	Control group (n=21)	Treatment group (n=20)	t
Fear during the flight	25.81±4.80	13.25±7.97	6.07***
Fear of preliminaries	21.05±7.86	10.15±7.51	4.53***
Fear without involvement	2.24±2.47	1.40±1.79	1.24
Catastrophic thoughts	9.67±5.61	5.00±2.64	3.43**
Subjective physiological anxiety	21.90±6.86	14.35±9.25	2.98**
Fear level	2.71±0.46	1.25±0.79	7.22***
Avoidance behaviour	3.33±0.58	1.25±0.85	9.22**
Disagreeable responses	19.90±6.05	8.70±8.03	5.06***
Heart rate	1.31±0.09	0.99±0.04	2.85**
Temperature	1.01±0.03	1.00±0.02	0.64
Muscular tension	1.31±0.51	1.02±0.12	2.51*

Note: * p<0.05, **p<0.01, ***p<0.001

Discriminant analysis

In the *pre-treatment analysis* no discriminant function could be obtained due to the similarity between the groups with respect to the variables. It was thus confirmed that the two groups, considering all the variables together, were homogeneous with respect to fear of flying.

In the *post-treatment discriminant analysis*, with the aim of avoiding artifacts in the results, the eleven dependent variables of the study were excluded. In this second analysis we have taken into consideration two self-reported measures that we feel to be of special relevance in the case of this phobia: fear during the flight (EMV-1) and the avoidance behaviour assessed in the IDG-FV (“do you travel by plane when there is no alternative way to travel?”). As objective measures we considered heart rate and muscular tension during take-off in the simulation situation.

This analysis can be examined in detail in Table 5. The four variables showed significant changes in the Rao’s V, and the canonic correlation obtained was 0.85, with the discriminant function attaining a level of significance superior to 0.001. These results, together with the distance between the centroidal groups, mean that the confusion matrix gives 92.7% of correctly classified clients. Only one control group patient presents a profile of sco-

res similar to that of the treatment group, and only two patients of the latter group maintain similar scores in the dependent variables to those of the non-treated patients.

In the light of these results, then, we can affirm that psychological treatment by means of desensitization has been capable of producing a clear difference between the two groups, as is clear from the post-treatment assessment. It can be seen that only 10% of the patients with fear of flying do not undergo significant changes with respect to the fear level presented by non-treated patients. Moreover, in a small percentage of those with this phobia (less than 5%) it may subside within a short period of time.

CONCLUSIONS

Analysing the results of this study in a global way, we can conclude that the intervention program as outlined presents guarantees for its use in treatment for decreasing or eradicating fear of flying. The three criteria of success used in the differential analysis coincide in showing the lack of improvement in the waiting-control group and, by contrast, the significant development in all respects of the treatment group.

The multivariate analysis confirmed the absence of differences between the two groups in the pretest, and showed extremely satisfactory results in the post-treatment test. Using four dependent variables of the eleven available –variables which we consider crucial to be able to speak of therapeutic success– the classification matrix gave us a percentage of patients correctly classified superior to 90%. Only 3 patients of the 41 assessed were classified incorrectly, one from the waiting-control group and two from the treatment group. The cases of these three patients allow us to make two important observations. Firstly, the simple passage of time cannot be expected to improve matters: of 21 patients, only one presents a dependent variables profile similar to that of the treatment group. Secondly, the two treatment group patients classified incorrectly represent a warning that this therapeutic technique is not infallible in the field of flight phobia: a 10% failure rate is better than a 20, 30 or 40% rate, but 5% or no failures at all is better than 10%. Meanwhile, these first results do not allow us to affirm that the success of those who most improved is the maximum success possible. In view of all of the above we consider that in future research we must look

Table 5 Discriminant analysis in post-test between waiting-control group and treatment group through four measures									
1) DISCRIMINANT FUNCTION									
F	E.	%	variance	Correlation	After	Lambda	Chi	D.F.	Sig.
1	2.72	100%	.85	:	:0	0.27	48.66	4	.0009
3) TYPIFIED COEFFICIENTS Avoidance behaviours= 0.71 Heart rate= 0.43 Muscular tension= 0.27 Fear during flight= 0.31									
3) CENTROIDAL VALUES Waiting-control group= 1.57 Treatment group= -1.65									
4) CLASSIFICATION OF RESULTS									
Actual Group	No. of Cases	Prediction to control		Prediction to treatment					
Control group	21	20		1					
	95.2%	4.8%							
Treatment group	20	2		18					
		10.0%		90.0%					
Percentage of cases classified correctly:		92.68%							
Note: E. = Eigenvalue; D.F. =Degrees of freedom; Sig. = Significance									

into both why the therapy was successful and why it failed in certain patients.

Some of the precautions taken in the application of the desensitization program presented here may answer, in part, the first question. We consider that certain variables have contributed to the therapeutic success achieved:

1. The training in breathing and relaxation techniques was carried out rigorously, encouraging practice at home and facilitating overlearning. In our opinion, relaxation, sufficiently trained, can fulfil its authentic role as a response incompatible with anxiety.
2. The double filter developed for the elaboration of the hierarchy (cardinal and ordinal) resulted in a smoothly-gradated slope for each patient. We attempted to guarantee a minimum difference of intensity of anxiety between elements, and at the same time to avoid excessively recurrent elements. In this way we succeeded in exposing the majority of the patients to a total of between 25 and 33 elements, a number that probably made possible a suitable level of approach to the phobic stimulus.
3. The inclusion of gradated tasks in real situations provided an exposition *in situ*, and at the same time reinforced the improvements achieved in the clinical sessions. Furthermore, we feel that the precaution of not beginning these tasks until one third of the imagination situations had been overcome prevented advancing prematurely, before consolidation had been achieved. This absence of failures in the exposure in real life probably encouraged the sensation of self-efficacy in the patients.
4. Introducing the techniques of brief relaxation and stop thinking in the third phase of the program was also considered positive. These tools permit the patient to control physiological responses of activation and maladjusted cognitions that may induce the appearance of alarm signals. The perception of physiological and cognitive control foments the effect obtained in the clinical sessions, and confirms to the patient the innocuousness of the phobic stimulus.

As regards the case of failure, it is still early to draw any conclusions or make any suggestions. A more in-depth study of the success achieved by the patients and an increase in the number of patients treated will provide us with more precise criteria for measuring the

level of effectiveness of the technique and for determining which aspects may be responsible for its limitations.

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