Psicothema

Multimedia intervention for specific phobias: A clinical and experimental study

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Abstract

Background: Exposure is the treatment of choice for specific phobias. We present an experimental and clinical study on the efficacy of the progressive multimedia exposure procedure for specific phobias. **Method:** The sample size consisted of 36 individuals, 7 men and 29 women (mean age: 29 years old), with different types of specific phobias. A combined between-groups (3x4) with repeated measures design was used, including several follow-ups up to 3 years. Participants were assigned to different groups: Experimental (10), Waiting List (12), and Control (14). As an evaluation method, a Behavioural Avoidance Test (BAT) with subjective anxiety and heart rate was used for images and videos, plus general and specific anxiety questionnaires for each phobia. The intervention was carried out in four phases of multimedia exposure: photographs, videos, simulated stimuli, and real stimulation. **Results:** Anxiety and avoidance were significantly reduced in the experimental group, with a very large effect size (between $d = 1.37$ and 5.37). There were no significant changes in either the Control Group or the Waiting List Group. **Conclusions:** The treatment had a clinically significant impact on the daily life of the participants. This multimedia procedure was shown to be effective and to use few resources, thus allowing it to always be adapted to the individual characteristics of the participants.

Keywords: Specific phobia; progressive exposure; multimedia exposure; behavioural therapy.

Resumen

Intervención multimedia para fobias específicas: un estudio clínico y experimental. **Antecedentes:** la exposición es el tratamiento de elección para las fobias específicas. Se presenta un estudio experimental y clínico sobre la eficacia del procedimiento de exposición progresiva multimedia en fobias específicas. **Método:** participaron 36 personas, 7 hombres y 29 mujeres (media 29 años), con distintos tipos de fobias específicas. Se utilizó un diseño entre-grupos con medidas repetidas (3×4), incluyendo varios seguimientos hasta 3 años. Los participantes se asignaron a diferentes grupos: Experimental (10), Lista de Espera (12) y Control (14). Como evaluación se utilizó un Test de Evitación Conductual (BAT) con ansiedad subjetiva y tasa cardíaca ante imágenes y vídeos, cuestionarios generales de ansiedad y específicos de cada fobia. La intervención se realizó en cuatro fases de exposición multimedia: fotografías, vídeos, estímulos simulados y estimulación real. **Resultados:** la ansiedad y la evitación se redujeron de forma significativa en el grupo experimental, con un tamaño del efecto muy elevado (entre $d = 1.37$ y 5.37). No hubo cambios significativos en el Grupo Control, ni en el Grupo Lista de Espera. **Conclusión:** el tratamiento tuvo una repercusión clínicamente significativa en la vida diaria de los participantes. Este procedimiento multimedia ha mostrado su eficacia, con pocos recursos, permitiendo adaptarse siempre a las características individuales de los participantes.

Palabras clave: fobia específica; exposición progresiva; exposición multimedia; terapia conductual.

Specific phobias are classified within anxiety disorder categories and are characterized by being disproportionate and irrational types of fear, compared to the stimulus that causes such fear. This fear is persistent, produces interference in the daily functioning of people, and avoidance of situations and places where the phobic object can appear (Eaton et al., 2018). Phobias can be of different types: animal, natural environment, blood-injection-injury (BII), situational, and other specific cases. Seventy-five per cent (75%) of individuals with specific phobias fear more than one object or situation, with an average of three objects (Serrano et al., 2019).

Specific phobias have a general prevalence in the range of 3 to 12%, being higher in women than in men, although in the blood-injection-injury subtype both have a similar presence (American Psychiatric Association, 2014).

In vivo exposure is the treatment of choice for specific phobias (Böhnlein et al., 2020; Thng et al., 2020). However, this modality usually generates rejection and a significant number of treatment dropouts due to individuals facing the real stimuli (rejection of exposure therapy 25% and dropout rate up to 45%) (Choy et al., 2007; Issakidis & Andrews, 2004). Therefore, based on exposure, different types of strategies have been devised that aim to reduce fear (Telch et al., 2014). Among them are: the flood, the systematic desensitization, the exposure in imagination, the progressive exposure, the exposure through virtual reality (VR), and the exposure using multimedia elements which is the strategy we present here.

In vivo exposure has shown its efficacy in a wide variety of specific phobias such as: spiders, snakes, rats, dogs, thunder and lightning, water, heights, air travel, confined spaces, choking, dental procedures, blood, balloons, driving phobia, flying phobia, claustrophobia, etc. (Bados, 2015; Choy et al., 2007; Wolitzky-Taylor et al., 2008).

Furthermore, treatments based on virtual reality have shown their effectiveness in: fear of flying, social anxiety disorder and fear of public speaking, spider phobia, fear of tight/crowded spaces, driving phobia, fear of heights, snake phobia, cockroach phobia, mice and rats phobia, post-traumatic stress disorder, dental phobia, etc. (da Costa et al., 2018; Kaussner et al., 2020; Raghav et al., 2019; Serrano et al., 2019; Valmaggia et al., 2016), as well as an augmented reality modality for spiders, cockroaches, and acrophobia (Baños et al., 2011; Rio, 2012). After the considerable increase in research regarding anxiety disorders using virtual reality, this procedure has become a well-established intervention for specific phobias because significant decreases have been demonstrated in various clinical pictures of anxiety, making it a viable alternative to in vivo exposure, when this was not possible or when the experience was too unpleasant for the individual (Böhnlein et al., 2020; Park et al., 2019; Suso-Ribera et al., 2018).

Another type of intervention using technological resources involves multimedia treatments (photographs and videos), which have been successful for arachnophobia, blood-injection-injury, injections, hospital environment, phobia of flying, snakes, vomiting or cockroaches (Bados & Coronas, 2008; Campos et al., 2019; Capafons et al., 1997; Matthews et al., 2015; Quero et al., 2014; Vansteenwegen et al., 2007), since this type of stimulation has the ability to produce the same anxiety response and the extinction and habituation of its response to exposure (Ruiz-García et al., 2019).

In the present study, the use of multimedia exposure is proposed as it is a simpler and less expensive method for clinicians in private practice, compared to virtual reality, and it allows the therapist to elaborate all the specific images and videos that require the specific case for subsequent exposure. However, in many cases virtual reality software does not have all the possible stimuli for interventions and creating such software has a high cost. The aims of this study were: 1) to create and test the effectiveness of a structured progressive multimedia exposure procedure (with photos and videos); 2) to test the greater effectiveness of this system by comparing it with a control and waiting list conditions; and 3) to test the long-term efficacy of this multimedia exposure procedure.

Method

Participants

A total of 36 individuals (7 men, 29 women) participated in this study, with age ranging between 18 and 55 years (average age of 29.2 years). All participants had specific phobia problems (animals and insects, blood-injection-injury, lifts/elevators, heights, driving, aeroplanes, vomiting, stickers or labels). The majority of participants were university students, but there were also administrators, teachers, journalists, artists, workers, and unemployed individuals. Participants had isolated phobias, and no other simultaneous diagnoses. From the sample, 11 individuals had undertaken some previous psychological treatment, and 2

individuals had undertaken pharmacological treatment. The other participants had specific phobia problems, but they had not previously consulted a professional practitioner. The specific phobias presented by the participants were: animals (spiders, cats, snails, dogs, insects, rats, snakes, lizards), flying, driving, heights, blood-injection-injury, and other less frequent phobias, such as labels/stickers and vomiting. In the case of blood-injection-injury phobias, this was not accompanied by fainting.

Regarding participation, as inclusion criteria it was necessary to be of legal age, to not present other associated pathologies, to have expressed their desire to receive psychological treatment, to sign an informed consent, and to be available and willing with respect to the times and dates that were available for the intervention that would be held. Exclusion criteria were: undergoing psychological or psychiatric treatment simultaneously, not complying with the university service contract and operation contract, and requiring treatment other than exposure (refer to Ruiz & Valero, 2017).

A combined between-groups (3×4) with repeated measures design was carried out with three experimental conditions, and four evaluations in all groups:

Experimental Group. This group receives the psychological intervention for specific phobias consisting of a progressive multimedia exposure. The group is composed of 10 participants (2 men, 8 women), with an average age of 29.0 years. Pre-Evaluation (Ev1) was performed, then the intervention that is the manipulated independent variable (IV) was applied. At the end, a Post-Evaluation (Ev2) was carried out, and follow-ups were performed at approximately 6 months (Ev3) and one year (Ev4) after finishing the treatment.

Waiting List Group. This group has two phases. In the first phase, evaluation is carried out and in the second phase, treatment is introduced (IV). The group is composed of 12 participants (1 man, 11 women) with an average age of 23.6 years. Two previous evaluations (Ev1 and Ev2) were carried out in this group without treatment, with a waiting time of not less than one month. Subsequently, the experimental treatment or IV was applied at the end of the post evaluation (Ev3). Finally, follow-ups were performed at approximately 6 months (Ev4) and one year (Ev5).

Control Group. This group did not receive any type of psychological treatment or the multimedia exposure treatment. The group was composed of 14 participants (4 men, 10 women) with an average age of 35.1 years. Two evaluations (Ev1 and Ev2) were performed in this group with time lapses between the evaluations of at least one month, and another control evaluation at 6 months (Ev3). As explained above, the Control Group participants were, in principle, a Waiting List and they became controls because they finally did not undergo any intervention.

The allocation to the groups was made in a semi-random way to each of the experimental groups and controls, from the start date of the entire evaluation process, and also by way of the time availability of the participants themselves, the experimenter, and the laboratory where the experimentation was carried out. The members of the control group, finally did not go to treatment because when the time was right, they had no time availability, which corresponded with that of the therapist, they had changed their place of residence, or they had finished their studies. Table 1 shows the general scheme of experimentation, with the distribution of groups, and the sequence of evaluations and interventions in the different groups.

Table 1
Scheme of the between-group (3×4) design used in the research

Cases	Group	Problems	Assesment 1	IV	Asses2	IV	Asses3	IV	Asses4
10 Cases M=2 F=8 Age=30	Experimental	Snakes, noise, blood, elevators, heights, dogs, spiders, snails, driving	Q.Generals Q.Specifics Anxiety Heart rate	Treatment Exposure Multimedia	Ídem	Waiting time	Ídem	Time	Ídem
12 Cases M=1 F=11 Age=23	Waiting-List	Driving, blood, wounds, spiders, cats, injections, snails, dogs, insects, airplains	Q.Generals Q.Specifics Anxiety Heart rate	Waiting time	Ídem	Treatment Exposure Multimedia	Ídem	Time	Ídem
14 Cases M=4 F=10 Age=35	Control	Rodents, lizards, stickers, driving, snakes, heights, cockroaches, water, vomiting	Q.Generals Q.Specifics Anxiety Heart rate	Waiting time	Ídem	Waiting time	Ídem	Time	Ídem

Instruments

Different instruments were used for the evaluation: a common evaluation, general and specific questionnaires, and other ad hoc questionnaires. Due to the objectives and design of this group study, those that were common to all cases were used for the analyses. The rest of the instruments can be consulted in Ruiz & Valero (2017). For the common evaluation the following were used:

Behavioural Interview for Specific Phobias (BISP). The BISP (Ruiz & Valero, 2017) is a semi-structured interview for the behavioural assessment of any specific phobia. In it, phobic aspects, history of the problem, previous treatments, interference in daily life, and coping styles are explored. An expert researcher with ten years of clinical experience conducted the interviews.

Multimedia Behavioural Avoidance Test (MBAT). The MBAT (Ruiz & Valero, 2017) is an observational test with 10 photographic elements and 10 video elements, all of which are adapted to the specific anxiogenic stimuli that each clinical case feared. The images and videos were extracted from the Internet in some cases, and in others cases they were produced by members of the research team using a still camera or a video camera, respectively. The duration of the videos during the evaluation was 30 seconds. Before each stimulus, the participant reported on the degree of subjective anxiety on a Likert-type scale with a 0-10 rating (nothing - a lot). In addition, the reactions and emotions that the participants showed before each of these visual stimuli were observed. These ratings and reactions were recorded in an "exposure log" where the image, rating, maximum heart rate, and comments on their reactions were noted.

Clinical Fingertip Pulse Oximeter (MD300). This is an electronic device used by clinical doctors, which is placed on a participant's finger, and it provides measurements of heart rate and blood oxygen saturation (BOS). In each trial in the MBAT test, the experimenter recorded the maximum rate that was displayed by the device when each image or video appeared.

Self-Monitoring of Relaxation and Exposure (SMRE). A self-monitoring format of the SMRE (Ruiz & Valero, 2017) was made using paper and pencil note-taking, so that each participant applied the relaxation and self-exposure tests that they carried out (as indicated by the therapist) as homework. In the first part, relaxation tests were recorded using abdominal breathing, indicating the degree of relaxation achieved in each daily exercise (Likert scale 0-10). In the second part, the participant had to record the description of the situation, elapsed time, and subjective anxiety (Likert scale 0-10) when he/she encountered any of the feared stimuli.

Computer, sound speakers, video projector, and projector screen. The equipment included a laptop with Windows 7 operating system, the VLC Media Player for videos, Exposure Software for photographs, 5 W output power speakers for the videos with sound, a video projector that was located at one end of the laboratory space, and a white screen with dimensions of 2×3 metres that was located at the other end of the laboratory space and onto which the images and videos were projected.

State-Trait Anxiety Inventory (STAI). The STAI (Spielberger et al., 1986) allows an objective self-assessment measure of both state and trait anxiety. It is made up of 40 items in total, and is a highly reliable test, with an internal consistency ranging from α = .93 to .87.

Fear Survey Schedule III (FSS-III-122). The FSS-III-122 (Wolpe & Lang, 1964; Spanish version by Carrobles et al., 1986) is a self-report inventory consisting of 122 items, which refer to a wide range of fears: animals, agoraphobia, social, sexual, etc. and the degree of fear is indicated on a scale of 1 to 5. This inventory has an internal consistency of α = .97.

Fear Questionnaire (FQ). The FQ (Marks & Mathews, 1979; Spanish adaptation of Mathews, Gelder, & Johnston, 1986) consists of 24 items and it evaluates avoidance, anxiety and depressive responses, and disability. This questionnaire evaluates the degree of avoidance of situations corresponding to agoraphobia, blood-injection-injury phobia, SAD, and the main phobia that the person wants to be treated. Using Cronbach's alpha, this instrument has shown good internal consistency in the range of .83 and .86 for total score; and in the range of .71 to .83 in the three subscales for clinical population.

Inadaptation Scale (IS). The IS (Echeburúa et al., 2000) evaluates the degree to which the disorder affects various areas of the individual's life, such as studies, social life, free time, relationship, family life, and degree of global maladjustment. The scale consists of 6 items and the responses score the degree of interference (from 0 to 6), with an internal consistency of .94.

However, depending on each clinical case specific questionnaires were applied, using the following instruments:

Fear of Spiders Questionnaire (FSQ). The FSQ (Szymansky & O'Donohue, 1995; Spanish version by McCabe et al., 2005) is a self-report questionnaire with 18 items on a Likert scale from

0-7 (totally disagree to totally agree). It has shown good internal consistency using α = .88 and in post-treatment using α = .94. From this questionnaire, various adaptations have been made by the research team of the present study, changing only the word referring to the type of phobic object in the items, specifically for the evaluation of phobias of wasps, cockroaches, dogs, cats, snails, and mice.

Snake Anxiety Questionnaire (SNAQ). The SNAQ (Klorman et al., 1974; Spanish version in McCabe et al., 2005) is a questionnaire that assesses the severity of snake phobia. The SNAQ is made up of 30 true/false items and has a high reliability, α = .78 to .90. Various adaptations of this questionnaire have also been made in the present study, changing only the word that refers to the anxiety stimulus, specifically for the evaluation of phobias regarding dogs, cats, snails, and mice.

The latter two instruments, FSQ and SNAQ, were commonly used in 20 of the total number of cases.

Procedure

For the purpose of recruiting the sample via the dispersal of information regarding the present study, we resorted to the Psychological Attention Service of the University of Málaga, the publicity carried out through the Digital Information Displays of the university, and the local newspaper.

After signing the informed consent, in the first evaluation session, general and specific questionnaires were carried out for the behavioural interview. Later, the MBAT was carried out, with photos and videos containing the stimuli that were adapted to the specific participant. During the intervention, after the evaluation results were returned, the abdominal breathing training was carried out, then later the progressive multimedia exposure began, and at the end the participants were exposed to real stimuli or underwent in vivo exposure. From the first session, abdominal breathing exercises were prescribed for home practice with a duration of 10-15 minutes, twice a day, and the experiences where noted in the self-report for relaxation and exposures. In each intervention session approximately 20 elements, 10 photographs, and 10 videos were presented. The treatment phases were as follows:

1. *Exposure phase with photographs*. High-quality photographs related to the stimuli that were feared by each participant were used. The photographs represented the stimuli and feared situations in a focused way, with no distracters, and with varied formats regarding the specific phobia of each participant. The therapist guided the breathing exercise when necessary and encouraged the participants to observe the elements presented, additionally providing feedback and social reinforcement for the progress and control of the situation that was achieved. When the anxiety dropped by 5 points, then photographic and video elements were mixed in the same session.

2. *Exposure phase with videos*. The videos were of high quality and were specific to each participant, and in some cases the videos were elaborated by the researchers. During the exposition each video appeared for duration of 1 to 3 minutes. At the same time subjective anxiety and maximum heart rate were recorded. As in the previous phase, the therapist guided the breathing exercises when necessary, encouraged participants to continue exposing

themselves, and gave social reinforcement regarding the achievements.

3. *Exposure phase with simulated stimuli*. Once the subjective assessment of anxiety had dropped by 30-50% with respect to photos and videos, the simulated stimuli were introduced. This method was carried out in those cases where, due to the characteristics of the stimulus (e.g., insects, injections, blood, driving, etc.), it was possible to introduce stimulation that was as similar as possible to the reality. The participant was not warned that the stimuli were simulated. Plastic insects, dead insects preserved in alcohol, animal blood, syringes, arm compressors, unexpected recorded noises, etc. were used. Each new stimulus appeared during approximately 3 minutes of exposure, and the degree of anxiety that was thus produced was recorded.

4. *Exposure phase with real stimuli*. Finally, once anxiety scores had dropped from 0 to 3, the therapist created or encouraged live exposure situations. Depending on the type of phobia for each case, real insects, lizards, dogs, cats, exploding balloons, etc. were used. These tests were carried out both inside and outside of the laboratory. For example, with dogs in the faculty gardens, visits to the airport, driving in the participant's car, blood donation centres, among others. In real situations the therapist asked questions of the participant approximately every 3 minutes, and recorded the individual's assessment of their anxiety.

The sessions were held on a weekly basis, lasting 50-60 minutes. In some of the sessions as the treatment progressed, different types of stimuli were mixed. On average, 8 to 10 intervention sessions were used in total.

Data analysis

For the calculations that were carried out, the percentage of change, progress, or improvement between evaluations has been used. This parameter is chosen due to the various questionnaires used with different types of measures (direct scores, percentiles, etc.) to homogenize all the participants, obtaining a change value between one evaluation and another. The formula that has been used for this is:

$$\% \, change = \frac{Assessment \, 1 - Assessment \, 2}{Maximum \, Instrument \, Score}$$

This transformation reduces the number of possible comparisons, with the intention of reducing the Type I random error that could occur after so many repeated measurements of the evaluations that were carried out. Hence, in some cases, particularly in the Waiting List Group, up to 5 evaluations were obtained.

Given the combined between-groups (3×4) with repeated measures design, we opted to perform nonparametric tests of *k* independent samples, the H statistic of the Kruskal-Wallis test to compare between the three groups, and the Mann-Whitney U test for comparisons between group pairs and evaluations, since the assumptions for the analysis of variance (ANOVA) of a factor with repeated measures were not fulfilled. Finally, the effect size and Cohen's d were calculated in order to know the magnitude of the change that was produced.

Results

To analyse the data as a group, the common measures, the MBAT images and videos, specifically subjective anxiety and heart rate, were used; the general anxiety, phobia, fear, and interference questionnaires: STAI-S/T, FSS-122, FQ, and IS, respectively; and, the specific FSQ and SNAQ questionnaires (with their adaptations), because these were the most common to all cases, since in the other specific questionnaires there were insufficient data to apply the group statistics.

After the analyses were carried out, the percentage of improvement obtained in each group is presented for each pair of *evaluations carried out for images and videos*, in the variables subjective anxiety and heart rate, where it can be clearly seen that the high percentages of improvement in the images and the videos are produced only in the Experimental Group in the pre/post evaluations (Ev1 and Ev2) for subjective anxiety in images ($\chi^2 = 8.75$, $gl = 2$, $p = .013$) and videos ($\chi^2 = 11.785$, $gl = 2$, $p = .003$), and in the Waiting List Group in the second phase with the intervention (Ev2 and Ev3) for subjective anxiety in the images ($\chi^2 = 20.88$, $gl = 2$, $p < .0001$) and the videos ($\chi^2 = 21.50$, $gl = 2$, $p < .0001$). There are statistically significant changes in the phases whenever there was multimedia intervention. These changes can be seen visually in Figure 1.

However, regarding *the heart rate* the evaluations in both the images and the videos, no changes were found in the different evaluation comparisons. It seems that this physiological parameter with the fingertip pulse oximeter did not show statistically significant changes in any of the comparisons, either in the between group evaluations, or in the between group evaluations. Although in the Experimental Group it seems to decrease the registered heart rate, in images and in videos, this decrease is very scarce and it is not significant in any of the cases. However, the evaluations presented small correlations between subjective anxiety and heart rate in the Experimental Group but significant correlations ($r = .34$, $p = .04$) in the pre/post evaluation for images and also for videos ($r = .35$, $p =. 03$), but not in any of the successive follow-up evaluations. This could indicate, to a certain extent, that there are changes in the heart rate after going undergoing the treatment, since the correlations only occur when the intervention has been applied, and subjective anxiety seems to be related to the heart rate when presented with these projected images. Although, as shown above, the changes by themselves are not enough to show significant differences.

In relation to *the general evaluation questionnaires*, in the STAI-T questionnaire there were significant differences between Ev1 and Ev2 ($\chi^2 = 7.11$, $gl = 2$, $p = .028$). However, there were non-significant differences in the Waiting List Group (between Ev2 and Ev3), non-significant differences in the FSS-122 questionnaire in the same evaluations ($\chi^2 = 7.59$, $gl = 2$, $p = .022$), non-significant differences in the IS in Ev1 and Ev2 ($\chi^2 = 13.47$, $gl = 2$, $p = .001$) in the Experimental Group, and non-significant differences in the comparison between Ev3 and Ev4 ($\chi^2 = 4.83$, $gl = 1$, $p = .028$), which would imply a worsening effect, even if only by -10%, that was due to a change in one of the clinical cases. In the FQ there are significant differences between Ev2 and Ev3 ($\chi^2 = 6.18$, $gl = 2$, $p = .045$) but only in the Waiting List Group. In specific questionnaires of the FSQ, in the Experimental Group there are significant differences between Ev1 and Ev2 ($\chi^2 = 7.81$, $gl = 2$, $p = .020$), in the Waiting List Group there are significant between Ev2 and Ev3 ($\chi^2 = 9.87$, $gl = 2$, $p = .007$), in the SNAQ there are

significant differences between Ev1 and Ev2 ($\chi^2 = 6.32$, $gl = 2$, $p = .042$) in the Experimental Group, there are significant differences between Ev2 and Ev3 ($\chi^2 = 6.71$, $gl = 2$, $p = .035$) in the Waiting List Group. Therefore, there are statistically significant effects in the Experimental Group and the Waiting List Group when the intervention has been applied (see Figure 2).

Regarding the size of the effect and Cohen's *d*, a large effect is considered when $d > 0.8$ and $r > 0.37$ (Cohen & Soto, 2003). In the present study, the values that are found in the different instruments are between 1.37 and 5.37, hence it is considered that there is a higher effect size in the following comparisons: a) Experimental Group vs. Waiting List Group in the first phase; b) Experimental Group vs. Control Group; c) Waiting List Group vs. Control Group, in the second phase.

Discussion

The results of this study have been as expected. Exposure treatments have already shown their effectiveness in reducing anxiety behaviours in general and those of phobias in particular (Choy et al., 2007; Serrano et al., 2019; Wolitzky-Taylor et al., 2008). Specifically, for the treated cases, statistically and clinically relevant improvements were obtained in self-reported subjective anxiety and in the specific questionnaires for phobias, in addition to the reduction of escape and avoidance behaviours, and the improvement of the quality of life.

In the between-groups experiment that was carried out to compare the different experimental conditions, we found that in the Experimental Group and the Waiting List Group, once the intervention was received, the conditions between Ev2 and Ev3 are superior in the Control Group; and in the comparison between the Experimental Group and the Waiting List Group, the conditions between Ev1 and Ev2 are also superior. Further, in the Waiting List Group and the Control Group between Ev2 and Ev3, there are improvements in conditions appear in the MBAT images and videos for subjective anxiety and in the specific questionnaires in FSQ and SNAQ.

However, no statistically significant changes in heart rate appear in these same groups and evaluations, although a correlation with subjective anxiety has been found in images and videos. These results may be consistent with the results presented in the meta-analysis of Gonçalves et al. (2015), where the study presents mixed results in this regard that find, on the one hand, decreased anxiety and heart rate appear and, on the other hand, there is a study with results that show no consistency between evaluated psychometric variables and heart rate (Ruiz-García et al., 2019).

In the number of sessions, according to the existing reviews and meta-analyses using virtual reality, an average of 12 sessions were used (Serrano et al., 2019), and it was found that is between 1 session for height phobia and 21 sessions for flying phobia, which is a range that is similar to traditional in vivo exposure (Levis & Rourke, 1995). For multimedia studies, a range of between 1 intensive session for spider phobia and 26 sessions for blood-injection-injury were performed (Bados & Coronas, 2008). In a study that used videos for desensitization in vomiting phobia, between 10 and 13 sessions were performed (Philips, 1985), and for flying phobia between 12 and 15 sessions were performed (Capafons et al., 1997).

In the present study, for the Experimental Group we used in a range of 4 to 20 sessions with an average of 8.70 (4.78) sessions,
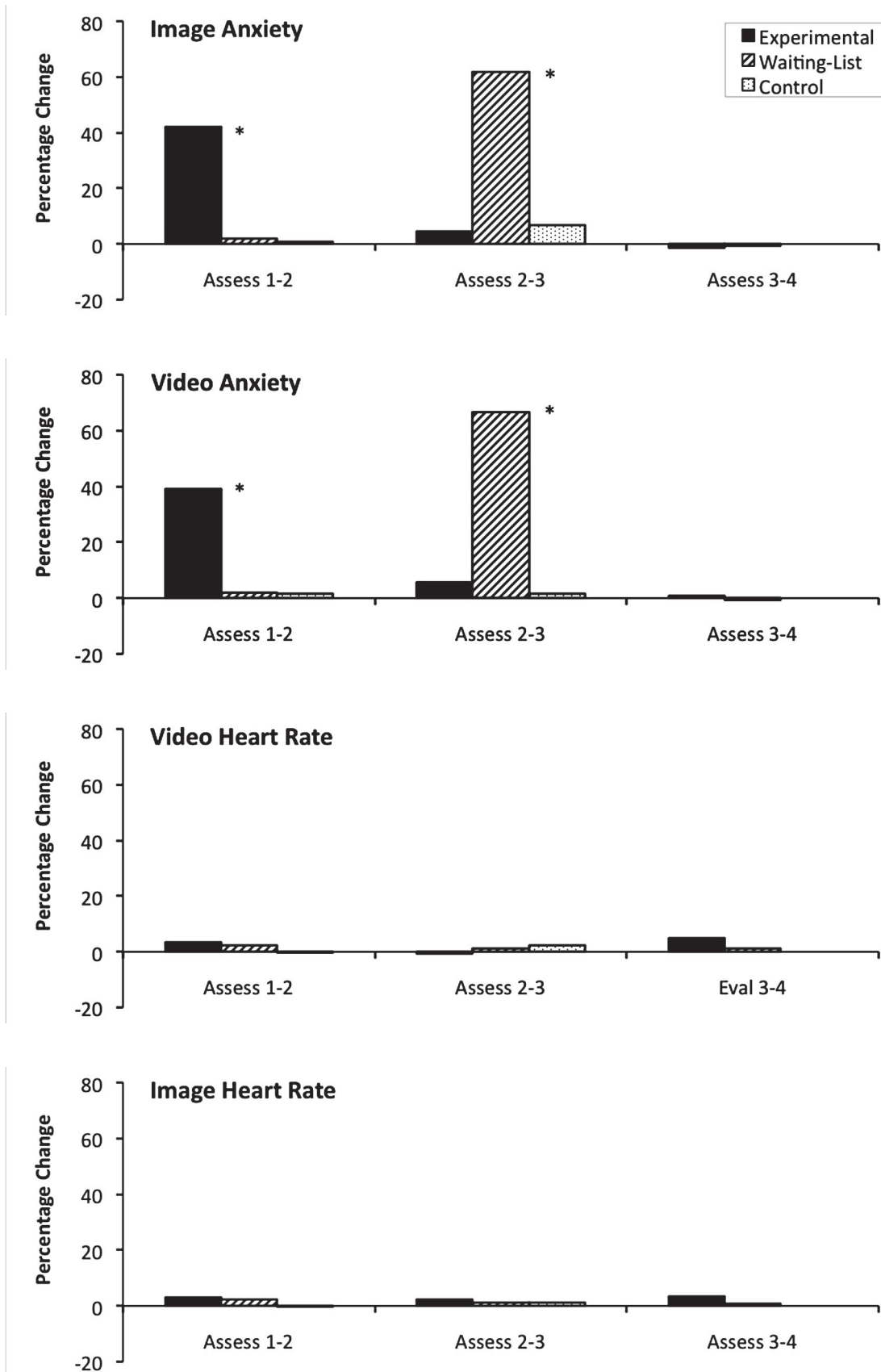
Figure 1. Graphs of the percentage changes between evaluations in each of the groups and parameters (* p<.05 **p<.01)
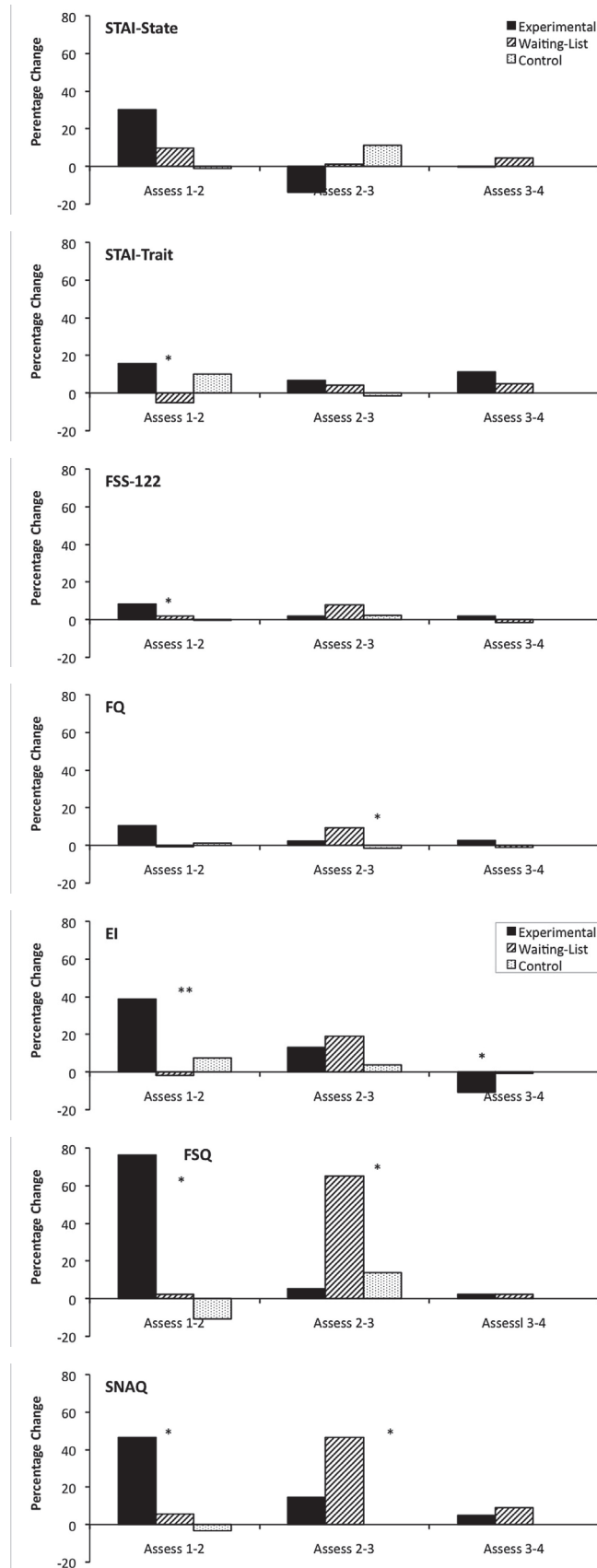
Figure 2. Graphs of the percentages of changes in each of the questionnaires in the different assessments and groups. (* p<.05 **p<.01)

and for the Waiting List Group we used in a range of 3 to 17 sessions with an average of 10.16 (4.30) sessions. This is the result of the variability of the participants and their different rates of improvement and evolution. However, the median number of sessions performed ranges from 8 to 10 sessions.

Regarding the follow-ups that were carried out, in other studies the changes were maintained at 6 and 12 months after the intervention thus indicating complete success. But in the present study, the follow-ups have been performed up to 3 years later for the Experimental Group, and up to 8 months later on average for the Waiting List Group. In the Control Group, the follow-up evaluations were carried out 5 months later on average.

Regarding the percentage of dropouts in general, all being considered together there are between 10 and 15% (Choy et al., 2007). In virtual reality treatments, there were between 5 and 9% dropouts (Opris et al., 2012; Valmaggia et al., 2016). However, in the present study there was a dropout rate of 4.5%, since there was only one dropout.

The present study has tested the efficacy of a progressive multimedia exposure protocol against a Control Group and a Waiting List Group. Great therapeutic success, statistically significant changes, very high Cohen's *d*, very high effect sizes were obtained. In addition, it allows generalizing the results to different types of people, sex, studies, personal situation, and specific types of phobia. All this allows the present authors to affirm that the improvements produced have been due to the treatment that was applied, and not to spontaneous remission or the particular history of an individual. Having produced these changes using different parameters and instruments, especially those that are specific to anxiety, although they do not appear in heart rate, as already discussed.

This work has relevant implications at different levels: technical, economic, security, sessions, and acceptance. Firstly, the technique is easy to use, it is sensitive to the changes produced according to the experimental and clinical research carried out, and it is capable of solving various types of phobia in an effective way. It is inexpensive and safe, since obtaining the necessary exposure material is affordable and accessible on the Internet, can also be created by the therapist, and provides the necessary security and privacy with the necessary control during the intervention process. In addition, the technique provides a sense of behavioural control and the client learns coping and anxiety management strategies. Regarding sessions and time, we have proven that these problems can be solved using 8 to 10 sessions, which means a period of 2 to 3 months. Finally, regarding the acceptance by the participants in the present study, those individuals presented a favourable attitude regarding participation, which also translates into the low dropout rate that was produced.

However, the present study also presents a series of limitations such as using a small sample of only 36 participants, as they were the only individuals who were readily available through the different recruitment channels that we accessed. The results in the Control Group and the Waiting List Group do not show any effect, and in addition the effects of the treatment appear over the very long term. On the other hand, it would be important to experimentally compare this type of intervention with other already validated treatment conditions such as flooding, imaginative exposure, or with virtual reality. Another of the limitations has been the type of physiological measurement using the fingertip pulse oximeter, since it was decided to use it due to its ease of use in private practice, having a low cost, and having a low level of intrusion with respect to the task to be performed. However, it has turned out to be somewhat discriminatory, although it has been useful during the cases to detect difficult situations during the sessions.

Finally, we highlight the beneficial contribution of this intervention procedure, which is sometimes used by some professionals in their clinical practice but for which, to the best of our knowledge, there is no empirical evidence on its effectiveness. For this reason, we can affirm that this work provides an exposure system that can be protocolized, and can easily be made available to any clinician in order to provide better quality, safety, and power for the improvement and solution of problems related to specific phobias.

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